

Junius Henderson
Field Notebook
No. 5

Aug 31, 1910 - July 18, 1911

Field Note Book
No. 5-

Note Book

Field Note Book

No. ~~4~~ 5.

Junius Henderson

Boulder, Colo., Wednesday,
Aug. 31, 1910.

Quite cool morning, but warmer than yesterday, warming up later.

Got new pair high faced boots at Smiths, \$7.75.

Frank Roliver and I started for Eldora on the 1:25 p.m. narrow gauge train, fare \$2.50 each. Hot at noon. Cool, cloudy afternoon. Reached Eldora at 6:15 p.m. and went to Gold Miner hotel. After supper we arranged with John Lilly for a team, as there are no saddle horses in town now.

Eldora, Colo., ^{Thursday} Sept. 1, 1910.

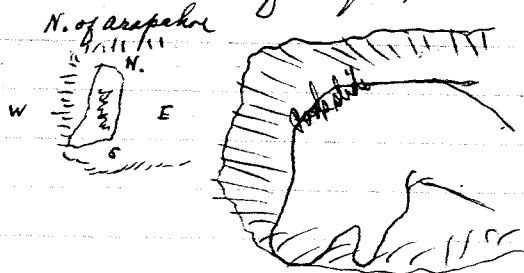
Bright, cool morning. Frank and I started with team and light wagon at 6:40^{a.m.} for Arapahoe. Left horses at Fourth of July tunnel at 9 a.m. and reached rim of cirque at 10:15. Took 2 pictures and started down to the ice. Chris crashed from the rim in snow stretcher nearly across the ice at the point where I usually go down from the "saddle," so we walked across with little out touching ice except for the last 10 feet.

The valley in the ice and moraine west of the ice tongue to the west of the terminal lake, as well as the valley to the east of the lake, have deepened perceptibly since my last visit. The ice at the end of the medial tongue has lowered perhaps 6 feet and is now 36.7 ft distant from the boulder used as a bench mark. At the big boulder on the east moraine the ice has lowered perhaps 8 or 10 feet. Actual determination difficult, as ice covered now with rock debris.

Bergschrund extends still clear across the supposed dead part on the south, close to the rock cliff. Crevasses of considerable depth (30-40 ft.) now show on the ~~west~~ east part which I once thought dead.

We climbed out on the northeast wall and photographed the ice field in the cirque between Arapahoe and "Frozen Lake" cirque. It lies due N. of Arapahoe glacier, from which it is separated by a very narrow, high ridge, very difficult to climb. It is strongly banded, ~~or~~ very steep ^{slope} with irregular crevasses in the

upper part. I judge from a distance that it is about ~~2500~~ 300 yds long and 1000 yds wide. The terminal lake shows no signs of rock flour, being quite clear, while that of Arapahoe is quite milky. I can now see them at the same time from the ridge and note the difference, which is very marked. No fresh moraine shows as on Arapahoe, so there is very little movement in spite of the steepness. The cirque faces east, as Arapahoe does, with most of the present neve on S. side of cirque, thus



A great quantity of fresh rock slide covers the upper part of the ice on N. W. corner just below Boulder city monument. ^{in N. Arapahoe} While we rested at the monument two tremendous slides occurred, rocks weighing many tons thundering down the steep walls of the cirque, one very large one bounding from a ledge for several hundred feet out onto the ice

We started down from north spur by way of south spur at 3 p. m., then entirely circling the barque, but changed our minds and worked down on the west side so as to pass through the narrow gap W. of the south spur. On N. side ^{of gap} we found one snow bank and on S. side 2 banks which illustrate the formation of straight or semi-circular ridges of angular rock, mixed with mud, found at the foot of steep slopes in all these canyons and closely resembling terminal moraines in form but plainly not glacial. The rock simply slides over the snow and lodges at the foot of the bank, thus ~~slides~~ ^{slides}, then when the snow melts back it isolates the ^{slide} rock from the hill slope. Such mud as occurs is plainly surface mud from the snow, mingled with vegetable particles. Reached gap at 4 p. m. Got horses hitched and started for Eldora at 5:05, arriving at 6:30 p. m.

at 12:30, while eating lunch, we

had a snow storm of typical mountain type, snowing furiously for a while, not snowflakes, not icy hail nor sharp sleet, but rounded, rather solid pellets, as usual, at least during summer and early autumn.

Many leucostictes and one ptarmigan in pure summer garb - not a white feather visible from above, within 6 ft. of us.

"Little" chipmunk and Say's Spermophile common at 4th of July tunnel, just below timber line.

W. H. Brooks, manager of 4th of July mine, invited us to supper but I wished to get over coreheroy roads before dark, so did not accept invitation.

West wind all day, chilly in wind, warm where protected from wind. Thunder shower at 9 p.m. Little charged 6⁰⁰ for team

Eldora, Col., Friday
Sept. 2, 1910.

Bright, cool morning, west wind, delightful after shower. Up at 5:30 a.m. Hotel bill \$3.50 each. Left on miffed train at 8:15 a.m., starting with 7 freight cars and

one passenger car, 6 passenger. Very slow travelling up the grades to Glacier Lake, the engine almost stalling on reverse curves and even on single curves near Cordial.

Boulder, Colo., Friday

Sept. 16 1910.

Started horseback from Sarnell's stable at 7:10 a. m. Pack on back containing 2 single blankets, camera, field-glasses, compass and tape. Bright, hot morning. Reached Sunshine at 9:25 and Ward at 12:10. Sprinkled about 11:45; cooler. Dinner 35¢, horse feed 75¢, rope 20¢. Left ward horseback at 1:15 p. m. Took the road running north to ridge north of town, crossed R. R. track S. of Newmarket mill and mine and took road running west. On California Gulch, a branch of left hand the ^{old} glacier overrode the hills, being several hundred feet deep and reached an altitude of about 9000

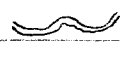
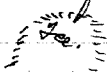
*

at a camp near where it will pass about 1000 ft. of
rainfall 6.4 mi. back to top of some 600 ft. of
500-400 yds. N. of bridge

feet. Left an imposing series of ^{recessional} moraine
rains, both terminal and lateral, forming
ridged terraces extending to within
a few hundred rods of Ward. Passed
over into South St. Vrain and followed
it up, passing Red Rock Lake, Brownard
Lake and Long Lake and at 4 p.m.
reached Fred A. Fair's camp just below
Isabel Lake, which lies on a rocky
bench over which the outlet makes
a fine cataract. It sprinkled much
of the afternoon and began to rain
just before I reached camp. Fair
was not in camp, but Patterson and
another man was. Valley is finely U-shaped
with heavy moraines, rocks in outcrops
and filled lake beds. The lakes above named
are rather large, country is much of it
heavily timbered. Fred Fair returned late
in the evening. Pine Squirrels common about
the lakes, also grouse.

Lake Isabel, Colo., Saturday
Sept. 17, 1910.

cloudy and cool. Fair and I arose at 5:15
a.m. and started up N. side of gulch to top
divide at 6:50 a.m. birches must

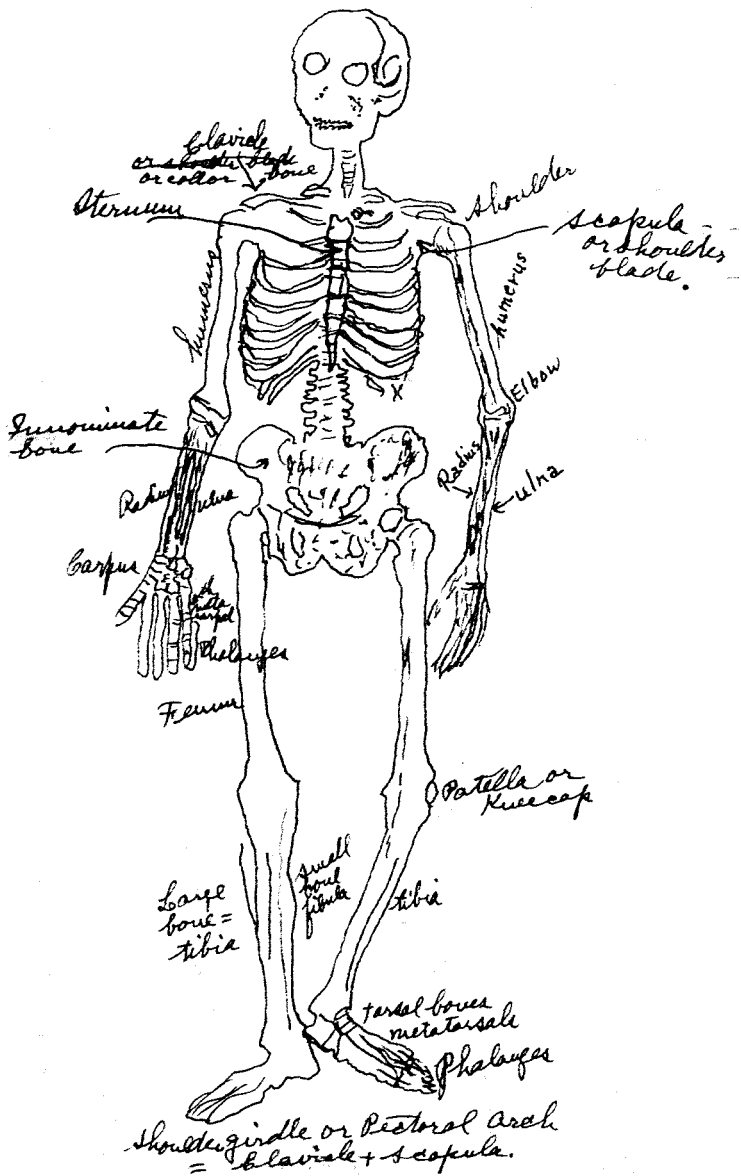
have been once completely filled. Crossed
the divide and found a well marked
glacier directly opposite the head of the South
St. Vrain which I call the Fair Glacier.
Could not get to it. Estimated 1500 ft. wide
and 2000 ft. high, using a measured lake as
basis of ~~measure~~ estimate. Very steep neve with
well defined glacier bergschrund a third of
way from head to foot of ice. Some distance
below this the ice flattens, then the end is
very steep. Stratification lines are bent into
a double loop this way , and are
somewhat cut by closed crevasse lines.
Front probably 45° angle. Moraine shows
rapid retreat, many recessional moraines
just in front of it on steep slope. Lake just
below is very green from the discharged
water. Lake in next cirque perfectly clear.
This cirque faces almost north and forms
natural trap for wind blown snow from
west, with glacier at head there .
Then we crossed to Isabel glacier at head
of South St. Vrain. It is 2500 ft wide

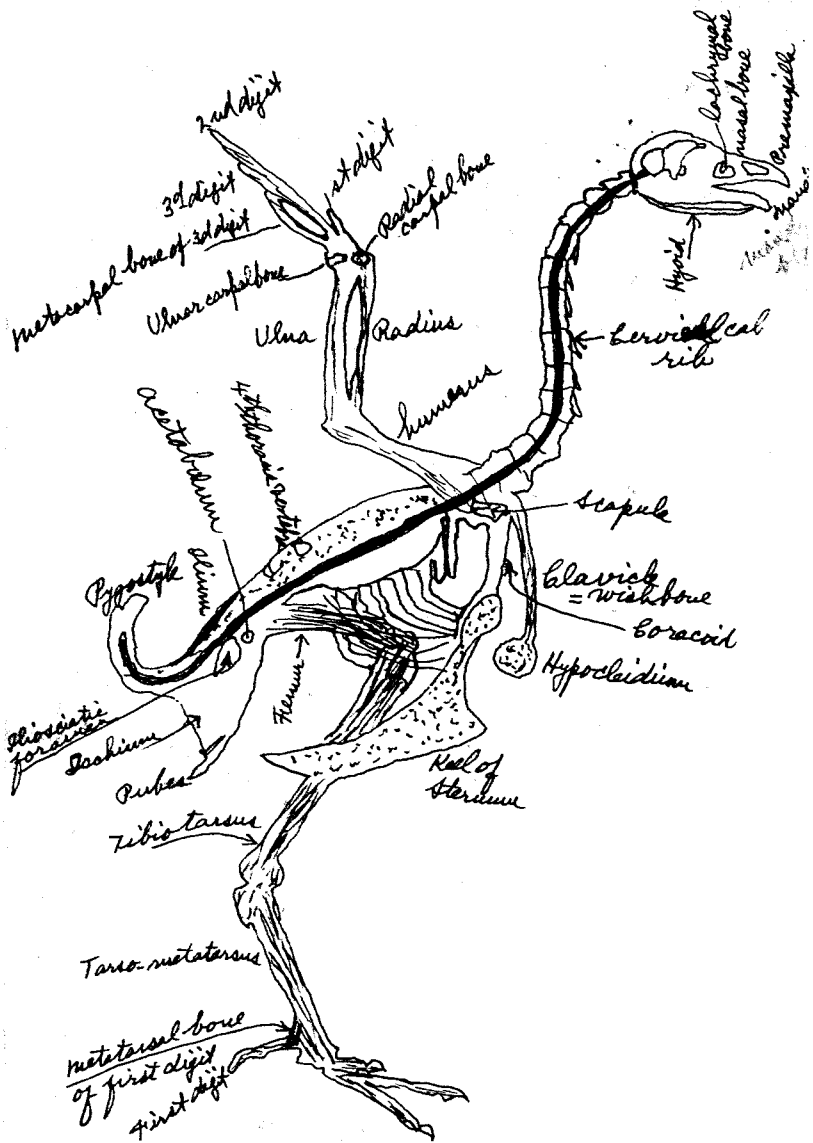
and about 1500 long. The bergschrund affords fine examples of plucking and sapping. Rocks were loosened by freezing and thawing and others pulled away by the condensed snow. Here melting and freezing at base of bergschrund is undoubtedly going on. No open crevasses below bergschrund, shrinkage crevasses 10 to 30 ft of the rather fresh moraine. Ice tongue ~~is~~ has slope of from 20° at top first to 15° then 10° , then 5° and finally flattens. Ice seems to extend under the moraine, so actual tongue not seen. If water from beneath is discolored it is much mingled with clear surface water. There is a slightly milky appearance to it anyhow, but it may be from surface wash, though not likely. Ice shown in bergschrund clearly 40 ft thick. ^{Bergschrund in places 20 ft. wide.} In main ice tongue probably 60 to 75. Strangely, the cirque faces S.E., part of nave facing N.E. and E. and part S.E. At 1 p.m. we at lunch and started on. Has sprinkled, rained and snowed much of time, with east wind. Reached camp at 4:30 very tired.

At camp there are Rocky Mt. Jays, White-crowned sparrows, gray-headed juncos, dusky grouse, pine squirrels, little chipmunk, mink, mt. sheep. (we saw signs above camp). On range saw leucostictes and heard ptarmigan. Deer mice abundant at camp. Fair saw three in the water.

Lake Isabel, Cal. Sunday,
Sept. 18, 1910.

Bright, beautiful morning. Up at sunrise. It soon clouded up, however, and sprinkled at intervals until I got nearly out of the mts. Started at 8:30 a.m., reached Ward at 10:30 and Boulder at 4:15 p.m. not stopping for dinner. Hot when I reached Boulder.





Domestic chicken

Shipped to Needles, Cali., by freight: 7/6/11

Sittman's Reptile Book	Warrens Colo. Mammals
Slope Reptiles (H&M)	N. Am. Fauna 1 to 21, 26, 28, 29-31
" Batrachia " " Bull 34	Nearns Mammals Mex. Boundary
Chapman's Color Key	Ribeiro's Moll. of S.W. 1-2-3-4
Bailey's Birds of W. U. S.	Hornaday's Taxidermy
Forest Trees Pacific Slope	Marshall's Herpet. Practical Zoology
Jepson's Flora Middle Cali.	Elliot's Mammals N. Amer.
Courtip Natl Herb. Vol. 3	Ruthven's Variations of Gartersnakes
Stephan's California Mammals	Stanger's Poisonous Reptiles
Topographic sheets of area	Needles x two have

1 insect net
1 fish seine
1 plant press + straps.
2 box driers + paper
30 traps
1 insect box
2 cyanide bottles
labels
Lub
100 bottles
1 dozen jars

1 pocket hatchet
1 saw
1 pick
Taxidermy tools
1-16 gauge gun
Ammunition
2 tarpaulins
2 pieces canvas.
2 camp stools
Paper + envelopes
tags 3 kinds

100

Nested Museum boxes	1 gal. alcohol
Insect envelopes	1 " formaldehyde
100 gelatin capsules	bottom ^{1.50}
Potassium permanganate	oil zirconium
Alum 2 parts Arsenic 1 part	Formaldehyde
Match boxes (packet)	String 2 kinds
Dissecting case	Wire 3 sizes
Shells for work with Indians	Towels
Mollusk strainer	Collecting Bags 10
4 canteens	1 camp pack
Rope for seine	Negative rack
Pick belt.	Note books
Newspapers.	Receipt books
coffee pot	knives & forks
frying pan	spoons & cups.
Writing tablets	Developing outfit
	developers, hypo etc.

To carry as baggage

Hunting licenses	Tripod
Game laws Cali.	Camera
Maps Cali. & Ariz.	Additional plates
Nail puller	Some ammunition
Mirror	Field glasses
Receipt book	1 taxidermy outfit.
1 notebook	Game letter gun
Shaving outfit	2 blankets
Clothes	Boots
"Meat Coast shells," keeps	Barometer
Marking pencil for boxes	Compass

Expenses, Needles, Cali., trip.

1911.

Feb 6.	- Freight on outfit	✓ \$ 13.95
" 18.	- Hunting license, California, required to accompany collecting permit	✓ 10.00
" 23.	- Fare Boulder - Denver	✓ 1.25
" "	- Lunch at Denver	✓ .40
" "	- Cartridges for collecting gun.	✓ 2.20
" "	- car fare	✓ .15
" 27.	- Hauling baggage	✓ .25
" "	- car fare	✓ .10
" "	- Fare Boulder to Needles, 2 nd class	35.00
" "	- Sleeper " " " Tourist	✓ 3.75
" "	- lunch (supper at Denver)	✓ .20
" "	- Paper tablets	✓ .10
" "	- Baggage check room fee	✓ .10
" 28	- Breakfast at Trinidad	✓ .40
" "	- Dinner at Las Vegas	✓ .75
" "	- Lunch at Albuquerque	✓ .10
Mar 1	- Breakfast at Winslow Ariz	✓ .75
" "	- Dinner at Ash Fork	✓ .75
" "	- Supper at Needles	✓ .20
" 2	- Additional freight charges at Needles	✓ 3.85
" "	- breakfast ²⁰ dinner ³⁵ supper ¹⁰ Room 50 [¢]	✓ 1.85
" "	- Wash basin	✓ .25
" 3	- breakfast 30 dinner 35 supper 20 bed ⁵⁰	✓ 1.35

" 4	Breakfast 31 [¢] lunch 30	✓	.61 [¢]
" 11	Lunch ³⁰ dinner ²⁵	✓	.55
" 11	Ferriage at Needles	✓	.25
" 11	Bottles for small animals	✓	2.55
" 12	Breakfast ²⁵ dinner ⁴⁰ supper ²⁵ room ¹⁰⁰	✓	1.90
" 13	drayage (trunk) ^{1.00} ferriage (trunk) ^{.00} (seloc) ^{.50}	✓	2.00
" "	Breakfast ⁵⁰ ferriage ^{2.00} lunch ²⁵	✓	.65
" 14	Stage, hauling trunk Needles-Mohave.	✓	1.00
" "	Mohave bat bought for identification	✓	.25
" 15	Matches ¹⁰ mammal brush ¹⁵ lunch ¹⁰	✓	.35
" 18	Freight (wagon) on Harrington's trunk 1.25		
" 22	Ferriage at Ft. Mohave	✓	1.00
" "	Lunch	✓	.25
Apr. 1	Cute Wilson ducks quail ²⁵ 2 nd snake ¹⁰	✓	.35
" 3	dryplates ⁶ money order fee ⁸	✓	6.26
" "	Lunch 2 meals	✓	.50
" 5	" 25 [¢] apr 6 Lunch ²⁵	✓	.50
" 9	Board at Ft. Mojave to date	✓	29.40
" "	Lunch 25 [¢]	✓	.25
" 10	Powell, hauling outfit Mohave to bottom	✓	2.00
" 9	Indian for help with series	✓	.15
" "	" " hunting roadrunner	✓	.25
" 24	Board		11.30
" "	Hauling outfit 2.00 ferry ^{1.00} drayage ^{1.00} 1 st 1 st		5.50
" "	Dinner ³⁵ supper ²⁰		.55
" "	Ticket to Boulder 41 ³⁰ supper ²⁰		43.50
" "	super Adams to 1/2 Joints		5.50
" "	Breakfast ⁵⁰ lunch ⁶⁰ dinner ¹⁰⁰		2.10
" "	30. lunch 30.		

Shells.

Miss Barbara Freire-Marreco bought shells at Phoenix for use ~~on~~ MoHAVE-Navajo reservation, Camp Mc Dowell, Ariz., and gives me the following names:

A small small marine snail, exotic.

achil' ^ahädyci - "small, unimportant, whereas pöwa is used of animate things as a rule and perhaps = young.

Strombus sp. (exotic) achil'a

Cardium sp. (exotic) fäbägäminxa - White, curved over like hand held palm downward.

Pecten circularis shy. (lower cali) "same kind, only striped.

Murex sp. (exotic) fäba ga munxa ^{tät}
_{white} _{seon³g³ae} _{thoruy³}
Kwagani said it is säb³ | kö min x^a

"kind of white looking | curved over | thoruy."
said he had seen them over west and smaller ones down on Colorado River.

Turbo variegatus (exotic) algeräb (shiny colors) gäti' (large).

Calliostoma sp. algeräb pöwä (little or young)

Rotella sp. (exotic) dyu riib dyudi (spiral) algeräba.

Cypraea coput-serpenti (exotic) achil'a (because something like bone. Bone in ordinary sense is t^y ägä.

Shells in general - algerába (shiny colors) or, ha goté algerába (great water shiny colors).

These being nearly all exotic shells, I suspect the Indian words are merely descriptive terms, not true original Indian names, or, if so, certainly of very recent application to these species. Lack of close observation is exhibited by noting only color stripes to differentiate *Cardium* and *Pecten*. Miss Freire Mares showed the *Pecten* valves to Santa Clara Indians, who thought the difference in color was due to sex.

Stearns (Ann. Rept. 1887, p. 325) says *Olivella biplicata* was used extensively as wampum among the Navajo. ^{some} Cortés found them in use among tribes near the Colorado in 1799. Dr. Edward Palmer saw a horse exchanged for an abalone shell in New Mexico. (Stearns, *id.* p. 329)

The Navajos have a species of currency called pooh, consisting of strings of shell beads, whose value is determined by the length (Whipple, Pac. R. R. Repts. vol III p. 115; per Stearns *Op. cit.* p. 330) ~~have~~ Navajos constantly searching mines for shells, hence present rarity (Stearns p. 330)

S. + Beetsel

Staple currency of California made of
Tinela stultorum (Pachydesma
crassatelloides, he calls it), cut into
disks or buttons from $\frac{1}{4}$ to 1 inch diameter,
pierced in center, strung on strings made
from inner bark of wild cotton or milk
weed, this takes place of silver,
their gold coin being made of abalone
(Haliotis) of various species. Strings of
both ^{or more precious} ~~are~~ worn as ornaments and
sacrificed as offerings on death of
prominent persons.

Stephen Powers "Tribes of California,"
Contrib to N. Am. Ethnology, Vol. III, pp
335-338, 1897. Whole volume makes about 100

"Concave-convex disks much used by both
ancient and modern tribes of California
and New Mexico. I essayed at one time to pur-
chase a long necklace of these homely ornaments
from a Navajo Indian in New Mexico, Arizona,
but soon discovered that it was beyond my
reach, as my best mule was hardly con-
sidered a fair exchange for it. These

beads are made from the Olive [Olivella
biplicata] chiefly, but to some extent from
small bivalves. Holmes, William H.,
"Art in Shell of the Ancient Americans," 2nd
Ann. Rept. Bur. Ethn., for 1880-81, p. 222, 1883.
Frag. carved on shell in Arizona. Op. cit. p. 268.

Mammals of S.W. Ariz. & S.E. Cali.

Indian names by Neeser, Mex. Bound. Know.

Mexican antelope - Antilocapra americana mexicana Merriam

N. Mex. & from San Francisco Mts., Ariz., to Col. Desert, Cali.

Rare now. Hualapai, An ukt. Hopi, Chur-vae

Badger - no records here {Hornaday reports in S. Ariz., p. 31 etc.
Russell says not now ext. by Pima,
Believe his "cause disease among men"

Bat. Nyctinomus femorosaccus Merriam.

Free-tailed. L. 103; head & body 60; tail 41; everted tail 23; head 23; ear from crown 14; from antitragus 20; tragus 1; humerus 28; forearm 47; 3rd finger, metacarpal 45; 1st phalanx 20, 2nd 19; 5th finger 44.

Type loc. Agua Caliente, Col. Desert, Cali., N. Amer. Fa. #2, p. 23

Bat N. mohavensis Merriam.

Free-tailed. L. 94; head & body 56; head 19.5; ear from base of antitragus 18; ear from crown 12; tragus 2; tail 34; everted tail 13.5; humerus 24; forearm 44; 3rd metacarpal 43; first phalanx 16, 2nd 16; 5th finger 42.

Type loc., Ft. Mohave, Ariz. N. Amer. Fauna No. 2 p. 23.

Bear - Grizzly - Dept. on San Francisco Mts. by early winter {N. Amer. Fa. #3 p. 85

Bear - Black - San Francisco Mts., Ariz. " p. 85.

Beaver - Broad-tailed Castor canadensis frontator Neeser

Mex. Mts. Montana, a long wooded stream.
Hualapai, Pah-hiné-ah, Hopi.
Hopi Ap-el-ná, Hualapai.

Coyote - No records

Bear - Bowes' Whitetail - Odocoileus couesi Bowes & Farrow
S.W. N. Mex., S. Ariz. & southward. Likely not W. to Col. Rivier.

Bear - Brooki's Blacktail - O. crooki Merriam
C. Ariz. & N. Mex. to Hill Williams Mts., Ariz.
Cuervo (Cac 310E) Mexican. AKW'AKZ Hualapai

Bear Mexican Mule Deer O. leucurus canus Merriam
To N. Ariz. Likely not W. Ariz.
Cuervo (Cac 310E) Mexican. AKW'AKZ, Hualapai
Sho-wok'-hua; Cho-we'-e book-tsi-ga'; Schu-we'-nig-muk; Hopi

Deer - Desert (or Burro) Mule Deer

O. l. eremicus Mearns.

Both sides of river and around head of gully.

Deer - O. l. californicus Eaton - Great Coast Region

Elk - Merriam's. Cervus merriami Nelson

N. X. Mex. & E. Ariz. approaching extinction.

Gopher - Desert Pocket. Thomomys perpallidus Merr.

Painted Desert, Ariz. to Colo. Desert, Cali. N. Am. F. #3 p. 71

Gopher - T. felons San Francisco Mt. & Grand Canyon St. p. 71

Mice

Deermouse - True's. Peromyscus truei Skiffel & H.

N. W. Ariz. to about Mohave City, S. in Cali. to nearly Needles
Ev. Z. 186 (190-195); T. 92 (81-102); H.F. 23. Ear from notch, dry,
2.2, 4 (2.5-2.4).

Deermouse - Towney. P. maniculatus rufinus Merr.

S. Rockies & scattered Mts. of Ariz. Type loc. San Francisco Mts,
av. L. 160 (150-170); T. 70 (56-73); H.F. 20 (19-21); ear from notch,
dry, 15: 5 (14.1-16.6). Tail blackish brown above, white below
Pow-wi-pi-scha, Hopi

Deermouse - Stephens Canyon Mouse. P. erinitus stephensi Mearns

W. & N. of river in rocky places.

av. L. 170 (161-176); T. 94 (83-101); H.F. 20; ear from notch, dry,
16 (15.3-16.5). Hairy tail distinguishes from eremicus.
shorter ear " truei.

Deermouse. - P. rowleyi Allen

Cali. & Ariz. mts, not reaching River below, thus

Deermouse - P. l. ochraceus. - E. Ariz. P. nasutus Allen, (S. W. Ariz. (springsville

" P. l. eremicoides Osgood. - Mex. N. to S. Ariz.

P. l. arizonae - S. E. Ariz. & S. into Mexico

Deermouse - Western Desert Mouse P. eremicus Baird {see under

both sides river, gully to both Tail longer than head & body, finely
annulated, body covered with short hairs.

L. 183 (172-192); T. 101 (84-108); H.F. 20.5 (20-21); ear from notch, dry,
17.5 (16.3-17.8).

Deermouse - P. maniculatus sonoriensis Le Conte.
W. Ariz. & E. Cal. Ariz. - Yuma Co., Mohave Co. opposite Needles,
H. F. Mohave, Yuma City, Phoenix, etc. Cal. - Needles, Yuma
Cob. Desert, etc.
L. 116 (152-178); T. 75 (65-80); H. F. 207 (20-21.5); ear from notch, dry.
16.4 (15.2-17.7). Tail brownish dusky above white below.

~~Deermouse~~
House mouse - next page

Mouse - Desert Harvest *Reithrodontomys megalotis deserti* Allen
L. 140; T. 75; H. F. 19 ear from crown 11.35; Pelage long soft. Tail and
ears hairy. Above yellowish gray, hind pointed with blackish
in medial region. Below white, hind gray at base.
S. Nev., S. to mouth of Colo. River, Sonora & Lower Cal.

Mouse - Grasshopper - *O. pallescens* & *O. torridus*
more common. probably do not reach river

Mouse - Yuma Grasshopper - *Onychomys torridus parvialidus* Merriam
Loma Cal. Valley. Both sides of river.
L. 154; T. 56.5; ear from crown 15; H. F. 21.5.

Pocket Niece - Perognathus apache merriam
Type Loc. Yuma Co. Ariz.
L. 140; T. 68; H. F. 18.5; ear from crown, dry, 4.

P. imitatus Merriam. Type loc. Fresno, Cal.
L. 137; T. 71; tail pencil 4; H. F. 18.5; ear from crown 4.

P. olivaceus Merriam. Type loc. Kelton Utah.
L. 104; T. 104; pencil 9; H. F. 25; ear from crown, dry, 5.

P. o. amoenus Merriam. Type loc. Nephis, Utah.
~~L. 104; T. 104; pencil 9; H. F.~~
L. 118; T. 93; pencil 9; H. F. 24.5; ear from crown 4.

P. torquatus Merriam. St. George, Utah
L. 125; T. 111; pencil 16; H. F. 26; ear from crown, dry, 6.

P. intermedius Merriam. Mud Spring, Ariz.
L. 103; T. 106; pencil 18; H. F. 21; ear from crown, dry, 4.5

P. fallax Merriam. San Bernardino, Cal.
L. 103; T. 104; pencil 15; H. F. 24; ear from crown, dry, 6.

P. spinatus Merriam. Loma Cal. Cal., 25 mi. below Needles.
L. 179; T. 104; pencil 15; H. F. 21; ear from crown, dry, 3.5.

P. penicillatus Woodhouse. San Francisco, Nts., Ariz.
L. 204; T. 115; pencil 18; H. F. 25.5.

P. arnatus Merriam. Mt. Diablo, Cal.
L. 160; T. 90; pencil 15; H. F. 24; ear from crown, dry, 7.

Muskrat - *Fiber zibethicus pallidus* Merriam. Pallid Muskrat
said to occur on Lower Cal.

Beaver - N. to Central Arizona.

Porcupine - No records. No timber. Watch for quawings

Prairie-dog - Arizona. *Synomys ludovicianus arizonensis* ^{Merriam}
S.E. Ariz.

Prairie-dog - short-tailed Plateau & Mts N.E. Ariz, N. W. N. Mex, etc.
Tä-ck-sē', Hualapai. TILL'KĒhā, Hopi.

Rabbit - Arizona cottontail. *Sylvilagus auduboni arizonae* Allen
Both sides of river & far int. interior of Ariz & Cal.
L. 359; T. 574; H.F. 84.4; ear from notch, dry, 68.9.

Rabbit - Rocky Mt. Cottontail. - *S. nuttalli pinetis* Allen
N.E. of Needles, at Hualapai Mts, Pine Springs, Prescott, etc.
L. 386; T. 59.6; H.F. 94; ear from notch, dry, 61.5

Rabbit - Desert Jack. *Lepus californicus deserticola* Merriam
Both sides of river, Ariz & Cal. S.W. Ariz. it grades
into *eremicus*, a sp. ranging into Mexico.

L. 447; T. 88.4; H.F. 127; ear from notch, dry, 124.
Rabbit - Arizona Jack - Black tail. Tail long, with short hairs, black above,
gray below. Ears with tail up, black; white tail - not when tail down.

Rat - Arizona cotton. *Sigmodon hispidus arizonae* Merriam
F.T. Verde, Ariz., southward
Kāh'l-lā, Hopi. Tu'-sā or Ah-mé-lā, Hualapai

Rat - Western Desert Cottontail-rat. *S. h. eremicus* Merriam
Both sides of river, Guma to Gulf, Salton River, etc.
L. 275; T. 130; ear from crown 15; H.F. 33

Rat - Brown Norway. *Mus norvegicus* Erxleben
occasional at Tucson Nogales, etc.

Rat, Black. *M. razzouci* Linn. Yuma, Ariz. 1900.

Rat. White-bellied roof rat - *M. alexandrinus* L. & H. C.
S.E. Ariz, Tucson, etc.

Mouse - House *Mus musculus* Linn.
all settlements in S.W.

Oo-wā'-g, Hualapai. Put'-chz or Ho-mick'se, Hopi.

Rat - Stephens Wood. *Neotoma lepida stephensi* Goldman
N. Ariz. Tail longer-haired than *Elmerstoni*, tail grayish
brown above, slightly paler below
L. 305; T. 155; H.F. 31.

Rat - Desert Wood. *N. desertorum* Merriam
W. of river in Cal. from Gulf N. N. of river above ^{Great} Bend.
Tail gray brown to black above, white below.
L. 295 (285-313); T. 131 (120-142); H.F. 30.1 (28-31).

Rat - Colo. Valley Wood. *N. albicula venusta* True.
Both sides river, N. to Nevada, E. & W. well into Ariz. & Cal.
30 other spp. in E. Ariz. & several on coast.
L. 396; T. 182; H.F. 35.

Sheep-Righorn-Mexican - Ovis canadensis mexicana Merriam
N. to hts. of Tex., N. Mex. & Ariz. - not to river, likely.
Päng-wü'h, Hopi

Sheep-Gaillard Righorn. O. c. gaillardi Merriam
S. of Gila and E. of Colo. River.

Sheep-Nelson Righorn. O. c. nelsoni Merriam
Western Desert tract, Desert Ranges of Mts. in
S. Cal. & Lower Cal.

Sheepka - No records

Squirrel - Antelope ground - Ammospermophilus leucurus
S. Cal. & along Colo. River in Ariz.
.. A. l. cinnamomeus Merriam. Painted desert Ariz. & Cal. Merriam
Nelson

Squirrel-Harris ground. A. harrisi Aud. & Bach.
central Ariz., etc.
Yü'ng-yi'-ü'h, Hopi. Him-mé'-dä, Hualapai

Squirrel-Rock. A. harrisi Merriam (wrong name) subsp.
Juta. from Gila River S. Cal. Long tailed, palid.
L. 245; T. 95; ear from crown 5; H.F. 40. perhaps

Squirrel-Sage ground. Callospermophilus lateralis Say.
Colo. Plateau in Ariz. & N. Mex. & northward
Yü'ng-yi'-ü'h, Hopi.

Squirrel - Spermophilus neglectus Merriam Related to
S. mohavensis,
S. mollis &
S. tridecemlineatus
Type loc. Mohave & Holman's spring, Ariz.
L. 278; T. 74; hairs 14; H.F. 32 N. Am. F. 22 p. 47.

Squirrel - S. mohavensis Merriam N. Am. F.
22 p. 15
Only in Mohave Desert, Mohave River, Cal.
L. 256; T. 68; hairs 16; H.F. 38
Other spp. in S. S. Ariz. N. Am. F. No. 4

~~Squirrel-Game Ground - Citellus tereticaudus Baird
Both sides lower Colo. Type loc. F.F. Game, Cal.
L. 250 mm; T. 97; H.F. 36; ear, rim 3; head 42~~

Squirrel-Rock - Citellus variegatus grammurus Say.
E. Ariz. N. Mex., Cal.
Him-mé'-lō-dä, Hualapai. Lā-cä'-hā, Hopi

Squirrel; Cal. - Procyon - S. Coast Region

Squirrel - East coast - *Sciurus aberti* Woodhouse
Pine forest area between spruce & juniper zones
N. G. Ariz., N. Mex. etc.

Mä-qui-ki-ä, Hualapai. I'ka-ghevk-ük, Hopi

Squirrel - Arizona Gray - *S. arizonensis* Coues
Sedona & timber on streams into lower pine zone.
Type loc. Prescott, Ariz.

Squirrel - Mogollon Chickaree - *S. mogollonensis* Kearns
N. G. Ariz., fir & spruce, 6,500 to 11,500 ft.
Hi-m-mäl-ë-gä-tä, Hualapai. Köll-chë-ow-ük, Hopi

Squirrel - *S. f. grahamensis*. Only Graham Mts, Ariz.

Chipmunk - Arizona - *Eutamias cinereicollis* Allen
Mts. N. G. Arizona
Yüng-yi-ük, Hopi.

Chipmunk - *E. dorsalis* Baird - Gila Chipmunk
Gila, Colorado & Yagui Basins
Yüng-yi-ük, Hopi.

Chipmunk - Merriam's. *E. merriami* Allen.
Upper Sonoran & Transition zones, S. Cali. & N. Cali.

Kangaroo rat - nocturnal - burrows about creosote bushes
Homaday - Campfire on desert & Lava p. 140
Probably feed on creosote roots

Desert animals differ little from elsewhere - not so, plants.

Botany

Janrea tridentata

Caracote bush - clusters of woody stems branching at end into leaf twigs. Oloriferous. # brown yellow.

Palo Verde-green tree - leaves tiny, slender terminal twigs. All twigs branches & trunk delicate green. Along water courses
lower beautiful yellow in March to May

bat claw - *Acacia greggii* - thorns point backward.

Coatillo - *Fouquieria splendens* - Branches near ground.

Leaves all along branches, without petioles, fall off in dry weather, leaving midribs as thorns.

mesquite - Horn ^{bean} pod with Palo Verde in N. Ariz. (Hornaday)

dark, old red, old not shreddy, grows larger.

mesquite - Kerua bean - spiral pods - ascending branches

slender outline distinguish from bean mesquite. shorter thorns, bark old is shreddy, young greener than old green. In leaf after rain or last of March. Complete fruit ruined throughly, other not. Both flower April to July. wood harder

Nistletoe - *Phoradendron* several varieties on desert.

Sourwood

bottomwood

desert Willow *Chilopsis saligna* T. & C. (James p. 221)

Arrow-weed

Smoke tree - *Salaea spinosa* x *varietal* - leaves spinous

Flowers purple.

Black salt-bush used for black basket pigment by Martinez Indians. (James p. 219 vol 7)

White salt bush common

Cactus - Barrel - *Cylindropuntia lecontei* - for water
Like barrel - with long curved spines.

Cactus - accordion plate for expansion & contraction
in wet and dry seasons. Hornaday p. 213.

Organ pipe cactus, branched at base

Giant cactus - branched higher

Cereus greggii - small, few spines, string like
root leads to large water-storing bulb a
foot below ground.

Cholla (cholla) cactus, stubby branched

Home of cactus wren & flicker. Hornaday pp. ^{32, 213} 225.

Long roots near surface for collecting
water after rain & storing - vegetable stand pipe.

Means for protection - spines for enemies
storage & resinous coating to preserve water
on desert plants

S.W. Indians; "Ethnologically, he is a squeezed-lemon."

Hornaday, barepines on desert & Leaves p. 67

Yucca-cactus-nests in chaya

Flicker " " "

White crowned sparrow - *Toutrichia leucophrys*

~~the~~ white line does not extend to bill.

Intermediate sparrow - *Z. l. gambeli* - gray or white in front of eye.

Oren-canyon - white throat.

Vireo and Texas *Reivick's*

" *Reivick's* - whitish or grayish beneath - white line over eye

Plain brownish back - spotted on the tail feathers

" Interior Tule - white line over eye - white streaked back.

Woodpecker - *Cabanis* ^{or less} 9-10 in. ♂ above blk, nape scarlet, white back, stripe, light white spate on wing coverts & tertials usually, white spots on outer primaries, outer tail feathers white. Below white. ♀ no scarlet nape.

" *Ratchelle* here 6-7 in. ♂ above black with white back stripe & some light spots; outer tail feathers white with black bars; forehead whitish; nape scarlet; below white. ♀ no scarlet nape.

" *Texas*. Lower Sonoran. 7 in. above barred black & white middle tail feathers black, crown red; below smoky with light black spots. ♀ crown black.

" *Arizona* - upper Sonoran. 7-8 in. above brown, nape red bordered by white patches; white spate on quills and bars on outer tail feathers. Below heavily spotted with brown. ♀ without red nape.

" *Williamson* *Sapsucker*. Winters here. ♂ above black; rump and wing patch white; 2 white stripes on side of head; throat & breast black with medial red stripe; belly yellow & barred with brown or black and white; rump white.

" *Ant-eating*. ♂ black at base of bill, back of which is a white band; crown red; above and chest band glossy green; chest blue, with white streaks; rump wing patch and belly white. Lower Transition.

♀ black band between white or yellow forehead & rump crown.

" *Lewis*, Transition & upper Sonoran of Arizona.

" *Flicker*. *C. c. collaris*. Occurs in Valley probably.

" *Silad.* Hood on back of neck. Giant cactus belt.

" *Sila.* ♂ head and below grayish brown; crown red; back and rump finely barred with black and white. Middle & outer tail feathers marked with black & white. ♀ Hood on crown.

Rattler posed for striking - not coiled.

Hornaday - Campfires on Desert & Lake p. 121.

Swallow - Bank - White below, broad grayish-brown band ^{breast} across

" Rough-winged - Grayish white below, belly ~~whiter~~ whiter

" Cliff-Throat chestnut, forehead and rump buff

" Tree - white below, steel green or steel blue above

" Violet-green, bronze ~~green~~ above, flank patches white,
often showing from above, white below extending back
of eye, thus



Tree:



Boulder, Colo, Monday

Feb 27, 1911.

Have had snow for 12 days. The first two storms brought about a foot. Then followed a week of cold weather with no thawing in the shade. Saturday afternoon it began again, yesterday morning there was 9 inches of fresh snow, continued snowing all day, probably resulting in a foot and a half. Cold this evening with north wind. Lots of snow on the range before this, from 10,000 to 12,000 ft. Has snowed frequently all winter there, but not much below 10,000 ft.

Left Boulder for Denver at 4:40 this afternoon. Left Denver at 7:45 p. m. for Needles, Cali, travelling second class. Bar dirty. Only a few passengers.

Between L

Between La Junta + Trinidad

Tuesday, Feby. 28, 1911

Snowed all night and still snowing. Had my window open with a screen in. At La Junta I found a snow drift on the bed, and closed the window. Only an inch or so of snow on flat plain S.W. of La Junta at 7:30. Very fine fleeces. Shore larks common, branching cacti abundant. Breakfasted at Trinidad at 8:15; doughnuts, baked apples and coffee 40¢. South of Trinidad we entered the foothills, with piñon pines, cedars and scrub oaks on the hills. At about 7000 ft. rock pines appeared, or probably somewhat lower. The rocks are approximately level, sandstones, ^{coal} and shales. At 7200 ft. (W. of the ^{Raton} tunnel, spruces or firs were abundant. Harrow-leaved cottonwoods in the gulches. Reached Raton at 9:05, on time. Here we left the foothills and passed out onto the plains again. At Shoemaker we were again in hills, with sandstones like "Sabote of Boulder district, but not tilted, covered with scrub pines and scrub oaks. Dined at Las Vegas at 1:50, on time. West of Las Vegas were occasional rock pines, soon passing

into the loose cedar-pine formation. Rock pines reappeared for a short distance as we crossed the divide to the Rio Grande Valley. On divide red rock hills. Formation resembles upper to lower ones of Northern bobcats. Cleared off as we started down Rio Grande Valley for Albuquerque about sunset.

Winslow, Ariz., ~~Friday~~
March 1, 1911

Cloudy again. Breakfasted here at 6.50, on trail. No trees now. Soil scantily clad with stunted sage and a little grass. No snow here. Grand canyon-like buttes appear to the north in hazy distance. Occasional clumps of cedars in storm water channels. Westward as we approached the mountains there is a loose cedar formation. Snow appears on the mountains. as we approached Flagstaff there was much snow along the way and Rock pines extended out in the valley and covered

the mountains, altitude 6,800.

East of Williams the oaks were ^{much} larger than any seen before on the trip and abundant young rock pines of all sizes, from seedlings up, mingled with the large rock pines, forming a dominant feature of the landscape, continuing to the very edge of the formation a short distance west of Williams. Then we abruptly entered the loose piñon-cedar formation. Both large and small rock pines are found here, mingled with piñons and cedars, but not so numerous, even small seedlings. Still some at Fairview. Here are many dead cedars, old and young. Some dying covered with mistletoe, others dying not so infested, and some infested ones seem healthy. Struck a dead man who was walking on track at noon. He ceased to breathe & I reached him.

Dined at Ash Fork at 12:20, a trifle late on account of the accident. Here the cedars and piñons are much more scattered. As we approached Seligman the cedars gave way and retreated to the distant hills. Alt. 5234 ft.

At Seligman just on time.
Had cedars again on run to
Peach Springs, which has an altitude
of 4596 ft. Then they ^{at once} dropped out as we
continued down the gulch, turning
S.W. for Needles. Mostly lava and
red sandstone for a long distance back.
A little green grass starting in moist
places at Peach Springs, the first I
have noticed. Greener as we go down.
A few more cedars seen.

We must be going down Trupton
Canyon, as Trupton is the Trupton Canyon
Indian School.

Great scarcity of bird life all through
Arizona. Saw two yellowbreasted birds which
may have been meadow larks, but looked
smaller, in dry valley not long before
reaching Kingman. Saw several hawks
today.

Mountains on our left as we
approached Kingman had a thin covering
of snow.

Reached Needles at 6 p.m., 10 minutes

late, and found ~~Her~~ J. P. Harrington at
Hotel Bengala Bagnall. at at Hervey House.
cool evening.

Needles, Bali., Thursday,
March 2, 1911.

up at 6 a.m. Rented a one-room house from
an Indian named Jack Jones, for a work room,
and moved our outfit into it. Cloudy, very
comfortable forenoon. We started after noon with
Jones, going to the terrace S. of town ^{edge of terrace 75'}. About ~~50~~ to
100 ft above banks of river. Terrace is com-
posed of river debris and covered with
large boulders, chiefly or entirely igneous.
The river is now cutting rapidly into
the town on the north.

English sparrow abundant about town.
Breuer blackbird " " "

Took one swift (lizard) and some
large and small black ants ^{all} from one
hill, Jones said the ~~black~~ large ones
were a different kind from the small
ones, and that these black ones were con-
fined mostly to the ~~mesas~~. I disturbed
the nest, and he said they sent out mes-
sengers to all the ants which were away

from home to come back and help
build a new nest.

Holes along sides of gulch appear
to be those of striped ground squirrels.
~~James~~ says they occur here in abundance

Have had copious rain within ~~two~~^a week.
Ground moist and flowering plants beginning
to blossom profusely.

Set some traps in evening.

Got room at Needles Hotel.

Needles, Cal. Friday.

Week 3, 1911.

Up at 6:30 a.m. & cloudy, air moist. Nothing
in traps.

Saw ^{savanna} ~~residues~~ among Brewers blackbirds
in town and apparently young Brewers
intermediata
Saw ~~white-throated~~ sparrows in town.

Rock wren on mesa - *Salpinctes obsoletus*.

^{Sage titmouse}
Small flycatcher in a gulch

~~4:00~~ Began raining at 9:45, just after
I returned from the mesa.

Jack Gould came at 7:30 a.m. to announce

that a relative had died across the river and he must go across. He said he would be gone till noon. Harrington asked if he could go and Jones said yes. Then he said he would not stay long - would "only cry for half an hour and then come back."

Intermediate white-crowned sparrows abundant in brush near our cabin. I watched them with the field glasses and saw none with black in front of bill.

Gopher mounds S.W. of ^{around Kingman} Drupton, are probably of this species. Desert or Palmd Pocket Gopher, *Thomomys perpallidus* (Merr.).

Pale muskrat - *Fiber zibethicus pallidus* Merriam, in small lake above Needles, Calif., on the Arizona side. (Stephens Mammals of Calif. p. 132)

The old river terrace here has a gentle slope from the foot of the mountains to on the west to the edge of where it abruptly drops to the present flood plain of the Colorado River. The banks of the river are about 10 ft. above water at the present stage.

Jack Jones showed familiarity with the idea of the small gulches in the mesa having been eroded by storm waters, and called gulches and gullies washes.

Rain continued until noon and it sprinkled until middle of afternoon, ^{quite cool,} then cleared off and warmed up.

Harrington returned at 4 p. m. and we packed my trunk for a trip to Mohave, Arizona, up the river.

Needles, Cal., Saturday
March 4, 1911.

Heavy rain just before day light, cloudy and cool when I got up. Yesterday the wind was northerly. This morning it is southerly. We carried our outfit to the ferry, very exhausting work. Got it on ^{steep} ferry at 9:30 and started up river on Arizona side. Cleared with south breeze, sun hot but tempered by wind. River bottom lands a perfect jingle of willow, cottonwood and arrowweed.

Took a nest six inches in diameter, enclosed except one-inch opening in upper part of side, leading into an inch tunnel which curved downward on inside. Lined with cotton from cottonwood or tule probably.

In tree 8 ft. from ground.

Flock of ^{barbade} geese passed over.

Killed Vermillion ~~cock~~ glycaether 4
mi. S. of Mohave school.

Indian there had ⁶ Green winged teal.

Red on side of head and crown, green ~~on~~
side of red crown.

2 bluebill, not know name. ^{blue with black tip.} ~~Sharp~~ ^{Marila}

1 duck with yellow bill and black
down middle of bill.

1 young cottontail.

A perfectly gorgeous sunset.

Reached government Indian school
at Ft. Mohave at 7 p.m., very tired, and
were kindly received by the Doctor
Lander or Landis.

The river valley presents many old channels,
closed ~~or~~ and silted up or bows, ^{and} small sloughs.
Found no mollusca except Physa.

Saw one Phainopepla. Clear, warm day.
" several Great Blue herons.

Ft. Mohave, Ariz., Sunday
March 5, 1911.

Cloudy, cool morning. We were assigned
to a table at the regular government mess.
Says Phoebe very common about the

buildings.

Up at 5:45 a.m. Rising bell rang then instead of 6 a.m. Had breakfast at 6:30 instead of 7 a.m. The Indian children marched to their breakfast in companies led by a very good Indian boy's band of 18 pieces. at 9 a.m. we watched in inspection. Boys divided into companies according to size, all uniformed and regularly officered. Girls similarly divided, with girls for officers. There are, I should say, about 150 boys and girls here. The girl officers did not salute, as the boys did. Two small girls were sent ~~off~~ from the ranks for failure to wash their hands or some other untidiness. They hung their heads, but did not cry.

The old fort buildings are of adobe brick, not slatted, painted red. The doctor showed us through the hospital.

Our quarters are in one of the old fort buildings. adobe walls 2 ft thick.

They were having a dance at the ~~school~~ gymnasium when we arrived, the Indian band furnishing music, except when the band boys were dancing. Then they used a phonograph. Plant lighted by acetylene gas, which is turned off early except Saturday nights, when it burns till 9 p.m. on account of the dance, which ends at 8 p.m.

Miss Flint, an Indian who sat opposite me at the table, is an Oklahoma Indian, probably halfbreed, Cherokee or Osage.

N. P. White, disciplinarian of the school, is a halfbreed (from a Sgt. Mohave soldier, probably) Mohave.

Caught a cockroach last night and a house mouse ^{at home} today. Set traps along river bank and one on mesa.

The river terrace just below the school is fine. The mesa here has a covering of rather fine gravel (up to 2 inches or so) and below are larger boulders, several inches in diameter, all thoroughly water worn, no angular material on surface as at Needles.

afternoon partly clear, warmer, and
cool again in evening - Hazy.

Fort. Mohave, Ariz., Monday
March 6, 1911.

Up at 5:30. Saw the interesting ceremony
of raising the flag just as the sun peeped over
the hills in the morning, the Indian boys and
girls drawn up in double line, facing the
flag, with hats off, the flag rising very slowly as
the band played Star Spangled Banner very
softly, then all marched to breakfast. They did
not have uniforms on, but were dressed gero-
misciously.

Bright, clear morning. A house mouse
and a deer mouse in the traps, former at house
on terrace, latter at river's edge. A trap under
greasewood bush was sprung - nothing in it.

Very little Indian music here. They all
sing and whistle white man's music instead.

There are about 100 boys and 65 girls in the
school. Five days each week they spend
forenoon in school, learning reading, writing

arithmetic etc., up to about 7th grade work.
Afternoons the boys spend at ^{industrial} ~~seasonal~~ training,
carpentering, farming, etc., and the girls engage
in domestic science.

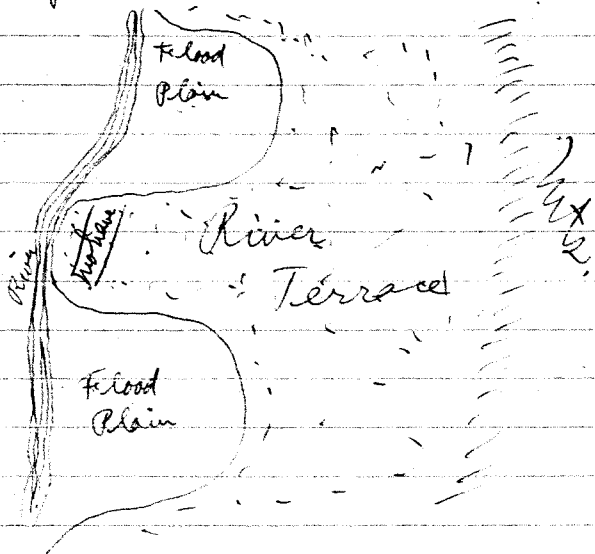
Have religious service Thursday evenings
by a Wesleyan minister and Christian Endeavor
Sunday evenings.

Salute flag morning and evening daily.
early Marriage customs lax. When girls reach
marriageable age they go with first one man,
then another, until pregnant, then live
with one of them until he tires of her,
when she goes to another. Government
insisting now upon regular marriage.
When boy and girl meet in the brush they
have intercourse without further ceremony.
Girls go to Los Angeles to good families
under "outing matron" to learn household
duties, and boys go to farms, orange groves,
etc.

Mr. T. Harmon Parkhurst, 4421 Kings-
well Ave., Los Angeles, Cali., with the Santa
Fe R.R. survey, camped below the school,
called at noon. He was formerly with
Smithsonian Institution.

I went up river, afternoon, cloudy.

River bottom opens out above and below the school, which is situated on a peninsula of the old river gravel, thus



Shot a shore bird, but it fell where I could not get it. Did not identify it.

Saw lots of Great Blue Heron tracks on the muddy flood plain.

Shot 2 Stansbery's swift lizards and saw many. They were both females.

Shot an immature ^{intermediate} white-crowned sparrow, a brewer sparrow, a rock wren and a plumbeous quaticatcher.

Set 13 traps.

The exposed bed of gravel is fully 250 ft. deep here.

Mohave, Ariz., ~~the~~ Tuesday,
Feb. 7, 1911.

Cool, cloudy, strong southerly breeze.
Nothing in traps. Collected some plants
and skinned birds in forenoon.

Two sand hill cranes flew over camp.

In afternoon I went down river. Saw
several ducks and snipe, Wilsons, Gallings delicate.

Shot 2 female redwings, one ^{Western} chestnut backed
bluebird, *Sialia mexicana occidentalis*,
2 Western Savannah sparrows?, one Western
Vesper Sparrow and one Desert Song Sparrow.
Also one Round-Tailed Ground Squirrel.
Saw one sparrow-hawk.

Mohave, Ariz. Wednesday,
Feb. 8, 1911.

Cloudy, breezy, warmer, this morning

Old Mohave informant identified the young
female ground squirrel ^{#253} as an old one female,
about to bring forth young. It was in fact a
young female, with teats undeveloped and no

signs of pregnancy. Also said its hearing is very acute, which is doubtful, in view of the rudimentary ears.

He identified Western bluebird male (*Sialia mexicana occidentalis* #255) as a female and said male was all blue, no red.

Also gave ^{but one} same name to Western vesper sparrow and desert song sparrow, designating the former as female and latter as male. When asked why he considered former female of the species he said because it was larger. He made it clear that he considers the two species but one.

Took a western black phoebe in the evening. ☉

Warm wind all day.

The gravel of the valley in the bluffs just above the school is well consolidated conglomerate, making several well marked ledges.

Fort. Mohave, Ariz. Thursday
Feb. 9, 1911.

cloudy, not cool, sprinkling at times this morning. Two Sonora deer mice in traps. An adult female #262 our ^{Mohave} Indian informant called a male and the young male in "blue" pelage he called a male of a different species.

a lizard with distinct head and reticulate back, #3, Feb 9, 1911, he said if bite, may kill you.

The western black phoebe #261 he called a male, but of course no one could tell without dissection, as the sexual organs are internal and the sexes are otherwise alike.

T. H. Parkhurst brought in a ~~swift~~ ^{horned lizard} and a lizard (zebra-tailed swift) #34.

The Mohaves always cremate their dead. They sit about and discuss how long patient will live. After cremation they have a feast. Jack Jones said they killed a horse for the last feast.

went out for a short time after noon, saw another western black phoebe

and heard several

saw a flock of a dozen or more
Barrow's goldeneyes (*Clangula islandica*) on
the river, also 2 blue herons on the bank.

vesper sparrow common on the mesa.

Found 2 ^{abert} canyon towhees in the
traps.

Ft. Mohave, Ariz, Friday
Mch. 19, 1911.

Rained during night, cool and cloudy
this morning, wind southerly

Ft. Mohave was established nearly 60
years ago, at the point where the old
Santa Fe trail crossed the Colorado river.
The trail can still be seen.

One young male Sonora deer mouse in
the traps, 2 sprung. Two had been tampered
with by Indians. A foot of a wood rat was
in one steel trap and tracks around it of
the fox or small dog which robbed the traps.
Several peals of thunder and a brisk
rain during forenoon, then cleared off with
strong west wind

Bought \$5⁰⁰ worth of bead work from a Mohave woman who spoke good English. She said Mohave do not make baskets or blankets and had forgotten how to make mud pottery.

Jack Jones wanted the babies to eat of the mice & skin.

An Indian boy said: "Please, can I come in and see your birds," so I let him in."

The Indians consider the Tebra-tailed lizard (our field No. 34) good to eat.

Parkhurst brought in two more specimens of what I take to be ashy horned lizard (*P. calidarius* Cope), but the three specimens we have had a decided pink hue, especially in spots, with rows of white spots across back and only dark bands, not black.

An Indian boy brought in a striped lizard, with 4 yellow stripes, the dark intervening stripes dotted with yellow, abdomen and tail blue, perhaps a young tessellated lizard *Cnemidophorus tessellatus*.

Wind has blown strongly from S. E. since middle of forenoon.

River is rising, showing warm weather in the mountains.

Henry Fulton, now full-bearded and in charge of the Santa Fe R. R. survey for a road up valley, called in afternoon.

Ft. Mohave, Ariz., Saturday
Feb. 11, 1911.

Bright, sharp morning, but quite warm by 8:30.

Old Indian informant said the bird which I have identified as female ruby crowned kinglet and the Vermillion flycatcher live on insects which they catch on the wing, which is correct.

He also said (Jack Jones agreeing with him) that the western bluebird lives on wheat and corn and they never saw him eat anything else. This, of course, is not correct.

The old man identified the ^{male} Vermillion flycatcher as a female and said the male is all red.

at 8:22 I started on foot for Needles with a light pack. Just below the fort I

took off one pair of drawers, ^{+ undershirt} having put on two thin suits in the cool morning.

On bottomland below fort saw a dozen Abert's towhees, 2 flocks of quail, one flock ducks and heard many strange bird songs.

Reached Bottomia (just changed, I believe, to Lonicolonia) 6 miles from Needles, at 11:10 and stopped for lunch.

Reached the ferry opposite Needles at 3:15. River was flooding the lower ~~bottom~~ flood plain, so I had to go down river half a mile and wait for the boat for 40 minutes.

Shot an Abert towhee about 4 miles above ferry and saw several others.

Saw a western black ~~towhee~~ ^{phoebe} at ferry.

Evening warmer than any I have seen since arrival in Colorado Valley.

Needles, Cali. Sunday
Feb. 12, 1911.

Bright morning, cool at first, quite comfortable by 9 a.m., with strong west breeze.

Packed Harrington's trunk and a box of formaldehyde and bottles in forenoon.

English sparrow is common here.

The presence of abundant palms and eucalyptus, ^{pepper, oleanders and a few others.} here makes it a typical California town.

Friday a young Mohave carpenter's assistant was looking at a young and one old Sonora deer mouse and called them both "white man's mouse," confusing them with the house mouse.

Saw one intermediate sparrow, *L. gambeli*.

Robbins arrived at 6 p. m.

Needles, Cali., Monday
Mch. 13, 1911.

Up at 6 a. m. Got 2 trunks and a box to ferry at 8 a. m. Bright, cool, strong ~~westerly~~ ^{westerly} ~~or northwesterly~~ wind. Got across river at 9:10 and started north on foot. Reached store 6 miles N. at noon, lunched and started on. Wind has blown strongly from the north (directly ahead) all the way.

Saw two large flocks of ^{Gambel} quail, some ^{W.} vesper sparrows, Abert's towhee, shot a W. bluebird and 2 small species and ^{saw} one duck (*Bonaparte's goldeneye*).

Reached Ft. Mohave at 4 p.m.

One of the small birds collected was a female veering, the other a female plumbeous quatsatcher.

Ft. Mohave, Ariz. Tuesday
Mch. 14, 1911.

Wind still howling from north, cool but not cold, clear. Bought a bat from an Indian. 10¢. In afternoon I walked down to lower bottomland. Saw 15 killdeer, 1 Marsh hawk, a flock of ducks, abundant cliff swallows.

The carpenter brought in a sidewinder rattlesnake in evening.

Ft. Mohave, Ariz. Wednesday
Mch. 15, 1911.

Hazy, warm, not very windy. A pine rat and field mouse in traps, 3 other rat traps sprung with hairs of rats and one rat leg in.

Half a dozen mouse traps were sprung, perhaps by wind. Parkhurst brought in a kangaroo rat, badly torn, and I skinned it. Skinned 3 bats, one rat, one deer mouse, one kangaroo rat, 2 birds and one decapitated snake today. Much warmer this afternoon, I worked with sleeves rolled up. Talked with Mr. Brace about school.

Says there are ^{about} 190 pupils - 15 more boys than girls. Mr. Davis is principal, Mr. Brass and Mrs. Duval are assistants. Mr. Duval is superintendent, Miss Flint is seamstress.

Many graduates go then to larger schools, as Phoenix or Laschile. ^{Many} some go back to tribal customs. They need considerable stimulus from without.

The ditch at foot of bluff at Ft. Mohave exposes a fine sand, but slightly consolidated beneath the coarse gravel. The lower gravel is cross-bedded. Saw hilldeer in numbers and a marsh hawk.

Ft. Mohave, Ariz. Thursday
Feb. 16, 1911.

Bright, very calm, warm. Early morning was cool. An Aberti towhee in mouse trap and a rats foot in a steel trap. Robbins and Harrington went down the river in forenoon to remain several days. Skinned 2 birds and one mouse in forenoon. In afternoon went up to the nearly treeless bottomlands above the fort. Shot one Phainopepla, 2 white-intermediate sparrows, one western vesper sparrow. After supper I went to the farm land below the fort and set out poison. Saw a pair of mourning doves and shot one.

Saw a dozen Abert towhees roosting in one mesquite tree. It is the most common bird in the bottomland brush. The Western Tanager Sparrow is abundant on the creosote mesas.

It has been a very ~~warm~~ hot day. Slight movement of air from south.

Fort. Mohave, Ariz., Friday
Feb. 17, 1911.

Bright cool, calm morning. Saw 2 Plain-opeplas (probably a pair) together in the thicket on the river bank at the fort.

Mr. McMillan says he saw mourning doves some time ago.

It was very hot this afternoon.

I skinned 5 birds and 3 bats today.

Fort. Mohave, Ariz., Saturday
Feb. 18, 1911.

Bright, calm morning. Wind northerly. Heard first meadowlark just after breakfast. Shot a robin.

at 9:30 a. m. a flock of about 125 sand hill cranes passed over, flying in 4 divisions close together, going north in usual V-shape.

Went to lower bottom land in afternoon. Saw 2 more robins, 40 or 50 Wilson snipe, 20 or more killdeer, some teal drake, plumbeous quateaters and Aberti towhees.

Ft. Mohave, Ariz. Sunday

Feb. 19, 1911.

Strong ^{north} wind during night, continuing this morning, cooler, ^{partly} cloudy.

Went down river after breakfast. Saw about 15 robins, several flocks of blue-winged teal and 2 green-winged teal, and flock of female redwings. Have seen no male redwings since the flock at the barn a day or two after our arrival here.

The mourning dove I killed two or three days ago had its crop full of wheat and oats, probably taken from the freshly sown fields.

Robbins returned in evening.

Ft. Mohave, Ariz.

Monday, Feb. 20, 1911.

Bright, hot morning. Twice in trap at 8 a.m. a flock of over 100 white pelicans passed over the fort.

Killed a species of cactus wren. Have heard them frequently for a week or two but had seen none before.

The mice caught this morning are pocket mice. Their cheek pouches contained beans of screw mesquite and bean mesquite, and the cornmeal which was used for bait.

Harrington returned with Jack Jones at noon and we began preparations for a trip to Dead Mt.

A Mohave schoolboy was pelting ^a big Stansburys swift lizard with rocks & picked it up and tried to induce him to touch it, but he shrank away and emphatically shook his head.

We got across the river with our outfit by rowboat at 4 p. m., Robbins, Harrington, Jack Jones and another Mohave.

A flock of birds, black, with red bills, about 20 of them, which I took to be cormorants, passed down the river, flying very low over the water. (Bairdi cormorants.)

Harrington and the Indians went for a pack burro and Harrington brought it back after Robbins and I had camped on the river bank. Harrington and Robbins slept in bottom of 2 boats moored to the river bank. I found

two boards and used them to keep me
off the wet sand.

Nevada, opposite
F.X. Mohave, Ariz. Tuesday,
Mch. 21, 1911.

I was cold all night, with but one blanket.
Robbins and I got up at 3 a.m., rekindled the
fire and sat by it. I arose at 5 a.m. We got
the pack on the burro at 6:45 and started
west. Had trouble keeping the pack on and just
before we reached the terrace it turned under.
It clouded up about 7 a.m. and the barometer
dropped 15.0 ft.

Got a saddle and repacked, starting
for the mesa at 8:45. Had to wade up
to knees in 3 places.

After lunch Indians went on ahead
with burro, through Harrington's mismanagement
and were soon lost to sight in the rough
ground. We did not find their trail again.
At dusk we found wood and water and
camped in a light drizzle of rain, without
food or blankets. It was quite cold and
we found poor shelter from the variable
wind in the rocks. Altitude 2200 feet by ^{low} barometer.
Saw one mockingbird.

In Nevada, N.W. of Ft. Mohave, ^{Aug}
Wednesday, March 27, 1911.

Barometer still low in morning, cloudy.

We went up the gulch some distance, until the country became very rough, then Robbins and I refused to go further and started down gulch for food.

Saw Gambel quail and heard a canyon wren and numerous house finches in the gulch. Saw a number of lizards but was too weary, weak and hurried to take any.

Reached Ft. Mohave at 5:30, very weak and sore, both of us.

When we arose and went up gulch in morning, Harrington insisted on crossing to a gulch northward in hope of finding the Indians and burro. As the country was very rough, with a maze of deep canyons the search seemed hopeless, so we tried to dissuade him from going further from food in a weakened condition, but as he persisted we refused to go and turned back.

The whole trip was ill-advised, not planned at all and ill prepared. Harrington

day before yesterday:

came rushing in at noon, and declared that we must start in half an hour. He had no plan at all and had of course made no preparation. Robbins and I protested, but he was stubborn and unreasonable, his sole idea being to get started before his Indians backed out. He went to the store ^{and boarding house} and got several (~~two~~ three) gunnysacks of bread and canned goods. As we discovered afterwards, the things were simply thrown into the sacks, not packed at all. Butter was simply in the original package, nothing to prevent its melting in the hot sun and running over everything. Coffee and sugar were in thin paper bags, mingled with a lot of canned goods, so that when we opened them, ^{for a sack} for lunch yesterday we found the coffee and sugar mingled in the bottom of the ^{coarse} gunny sack and running through the meshes. The only cup he ~~had~~ had was one the cook had put over a pitcher of cream potatoes. He had some ^{old} baked or boiled potatoes in the bottom of one sack, where they were soon mashed into a sodden mass. ^{we found} He had only 5 small sized cans of beans, 3 small cans of beef,

2 small cans of salmon, ^{1 1/2 loaves of bread}, one pound of butter, to last 5 men for four days or more of hard travel ^{on foot} and mountain climbing.

When he brought all that to the room I asked him how he expected to transport it. He said we would carry it on our backs. I asked Jack Jones how much he would carry. He said "nothing but his blanket." Harrington said we could not ask the Indians to carry anything or they would refuse to go. I told him I would not attempt to carry any of that load except my blanket, a can or two of beans and two loaves of bread for myself. He finally consented to get a pack burro. He first said he expected to get a burro for the Indian policemen to ride, but we three white men were to carry the food. He was utterly unreasonable, would listen to no argument. He knew nothing about trails, nothing of the country. Had no plan whatever except to get started at once. Robbins and I finally foolishly consented to start.

I insisted that if we were to succeed we must push at once for a good camping place at the foot of the peak, ascend the peak, then if provisions and strength held out we could

collect and get place name data on the way back. I doubt whether the Indians knew much about the country. Jack Jones says he was there 20, 30 or 40 years ago, was very happy about it and has no ideas of distances. I do not know whether the other Indian (a policeman) was ever there.

Tuesday morning the first thing Harrington did upon starting was to stop for an hour, (after we had wasted a lot of time hunting a saddle for the burro which he failed to get the evening before) taking notes on place name and tradition concerning a hill which is in plain sight from Ft. Mohave and could be taken at any time. We finally stopped at noon for lunch, within 4 miles of Ft. Mohave in an air line, ~~so~~ not over five by our route. After lunch he began to pick up every plant he saw, ~~to~~ wanting to stop and get the Indian names of each one as he collected it, ~~wants~~ and to put it into the press at once, opening the press each time. We tried to convince him that it was folly to spend so much time, when we could collect them, carry them until we stopped to rest, then get the names and other data and put all in the press in a

few moments, as usual we could not convince him of the folly of his course. He has not the slightest capacity for planning work to save time, in order to do the maximum amount of work in the least time, a fact which he has illustrated daily, almost hourly, throughout the three weeks I have been with him, and he cannot appreciate the force of any suggestions in that direction. At the rate we were going we could not have reached any possible source of water in two days. Finally, while he was collecting plant fragments, work which he was wholly incompetent to do, owing to lack of judgment and botanical knowledge, and which work Robbins was doing efficiently, he let the Indians get out of sight with the burro. Then we succeeded in getting him to hurry a little. Even as evening approached he insisted on our stopping to get a picture of Dead Mt., when the light was so poor it would not make a good picture, and the same view could be obtained next day from any ridge we might cross, with as good or better light. We were all loaded down, Robbins carrying the plant

press, camera, etc., I carrying small gun, bags of bottles, alcohol, etc., Harrington carrying plate holders and about 10 dozen plates, ^{and though} plate holders could only be loaded in the night, and with limited number of plate holders the limit of possible pictures for the trip was 80.

In the morning, after another cold, sleepless night, when he insisted upon going into the next gulch, we tried to convince him of the folly of such a course and to point out that with a maze of gulches ^{in a rough country} the possibility of locating the Indians and ~~camp~~ burro was exceedingly remote, and would lead him further into a rough, foodless region, more remote from food and possibly from water, in a weakened condition, carrying him to the river miles further up with no knowledge ^{the country off as to} whether he would find anyone with food there. We urged him to turn back to where there was certainty of both food and water, but as usual he was unreasonable and we could make no impression upon him. We finally parted from him with great regret that he should persist in a foolish course - foolish even if he should be accidentally successful.

(See also tomorrow's record)

We could not convince him of the folly of collecting a lot of ^{common} plants and carrying them up the mountains, instead of collecting them fresh on the way down, when they could be gotten into the driers in fresh condition, or ~~so~~ of the folly of collecting unrecognizable fragments of plants, single leaves, dry stems, etc., without the parts which would enable one to identify them or even to recognize them again. He knows no botany or zoology, and will not accept the judgment of men whose business is to know those subjects and whose experience enables them to form accurate judgments. The same as to photography. He knows nothing of photography and cannot be convinced that it is impossible to take certain subjects so as to really show them, or that a photographer cannot retouch a photo of a plant he never saw, where the plant had been photographed ~~in~~ waving in a violent wind, the camera also vibrating in the wind, so that the picture is completely blurred, with no detail to form the basis of retouching.

He has constantly hampered our work

by insisting upon our doing things which cannot be done, though we always explain why, and by insisting that ~~some~~ ^{the} strictly botanical or geological parts of our work must be done our way. He has constantly wasted our time as well as his own, so that we cannot accomplish anything. We were asked to come here to do geological and botanical work to help him with the ethnogeological and ethnobotanical work, yet he took Robbins down river and kept him for a couple of days photographing Jack Jones process of washing his hair in all its minute details.

In the evening we saw another flock of ^{Bronco} cormorants flying down stream, low over the water, in wedge shape. Hot afternoon.

Ft. Huachuca, Ariz., Thursday,
Feb. 23, 1911.

Cloudy, cool morning. Sore from our trip, especially ~~my~~ ^{our} feet.

Saw numerous pocket gopher hills in the gulches of Nevada yesterday and day before.

Tuesday evening after dark Harrington talked seriously of starting over the divide into

the next gulch to look for the Indians and burros, although the country is ^{very rough} rough, there was no moon, it was dark and rainy, and everywhere were long-spined cacti of various species and thorny bushes, and he was very much fatigued. It was foolhardy but he would have gone, probably, if I had not dissuaded him.

Harrington arrived at 6 p. m., to our great relief. He had found a mining camp and had plenty of food. One of the Indians also came in with the burros, but Jack Jones stayed to hunt us.

I collected insects in the afternoon.

Ft. Mohave, Ariz., Friday
March 24, 1911.

Cloudy morning.

The Mohave belong to the Yuman linguistic family and scarcely differ from the Yuma in language. The Yuman include Hualapai, Yavapai, Cocopai, Dieguito, and Havasupai (at Bright Angel Hotel).

The Chemehuevi are in Shoshonean linguistic family. They are really the lower Colorado river Paiutes (Ft. Mohave and Parker). The family

includes Cokuila, Shoshone, Caraquebe, Sucki and many others.

Went down river bottom. Saw a flock of ducks, many Abert towhees, several female redwings, 3 mourning doves, one sparrow hawk, abundant killdeer and Wilson snipe.

Scarcity of hawks and owls here is noticeable, have seen but ~~for~~ one marsh hawk and 3 sparrow hawks.

In afternoon went up river. Collected a collared lizard and a black-throated sparrow, desert form.

Jack Jones returned in the evening.
Very hot afternoon.

Ft. Mohave, Ariz., Saturday.

Feb. 25, 1911.

Bright morning, hot day. Spent forenoon taking care of material already collected, cleaning our room and washing clothes.

In afternoon went up river, and collected a few insects, seeing nothing else we need.

Killdeer are common on mesa at the fort and on the farm in the bottom land below the fort. Have not seen them elsewhere.

Robbins and Harrington brought in a 50-inch rattlesnake in the evening (Western Diamond) from the Nevada boundary.

There is a great deal of agate in the gravel of the mesa about here and an occasional pebble of limestone containing fragments of crinoids and other fossils. There is much quartz and many black and red pebbles, the latter probably jasper. One piece of agatized wood was noticed.

Ft. Mohave, Ariz., Sunday,
Feb. 26, 1911.

Cooler, hazy and windy this morning.

Up to date we have at ^{taken} least 13 species of Reptilia (4 snakes, 1 tortoise, the balance lizards), one toad, 7 species of mammals (with records of several others) and 19 species of birds (with records of many others).

In forenoon saw one great blue heron and one marsh hawk.

Robbins says he saw the cormorants again and that they have yellow at base of bill instead of red.

The afternoon was quite hot.

I have done little work today except

to get part of the outfit together for the trip to the mountains Harrington is planning for tomorrow.

In evening a picnic party from the fort brought in from Hardyville a Western Diamondback Rattlesnake 53 $\frac{1}{4}$ inches long and 2 sidewinders 23 and 22 inches respectively.

Ft. Mohave, Ariz., Monday
March 27, 1911.

Partly cloudy, warm morning. Wagon started for boat landing with our ~~own~~ outfit at ~~8 a.m.~~ about 7 a.m. We left landing at 8 a.m. reaching opposite side at 8:30.

At Nevada side landing were a number of sparrows singing which I take for the desert song sparrow. Plumage mostly reddish brown above with big spot of same color on breast like black spot of tree sparrow, speckles of same color on throat. Inner web of tail feathers dusky but outer reddish brown, so ^{only} the latter color only shows when tail is closed or but partly spread. Gray mixed with the reddish brown above, gray stripe over eye and another just beneath eye, with reddish brown stripe interlocking behind the eye. The song

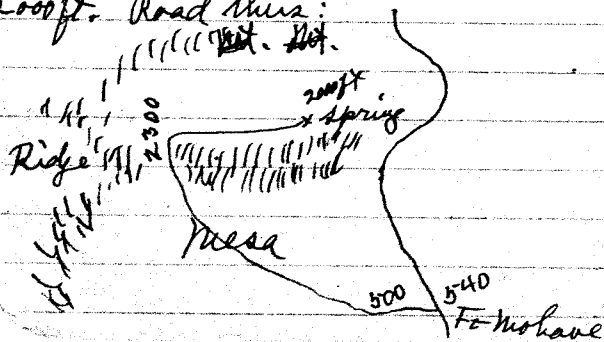
reminds me of that of the white-crowned sparrow, but is more extended and complex.

Started from river bank with stout wood wagon and Cheyenne driver at 10:45, with barometer set at 500 ft. Stopped at 1:15 for lunch at 1250 ft., having travelled N. 35° W. at rate of perhaps $2\frac{1}{2}$ miles per hour, therefore 6 or 7 miles from the fort, road quite direct. Temperature 77.

A week ago this was a veritable flower garden, a large number of species blossoming in profusion. Now many species have dried up and gone to seed. Still many California poppies.

Started on at 2:15. at 1500 ft. blue lupine and *Opuntia bigloba* (L.) etc. became abundant.

crossed divide at 4:50 and watered horses at Hyecho Springs at 5:30. and camped. altitude 2000 ft. Road thence:



Ayres
Hydro Springs, Nev.

Tuesday, Nov. 28, 1911.

Name of place not spelled correctly, probably
Bright morning. Up at dawn.

Mockingbirds sang all night, abundant.

Harbels Quail calling this morning.

Housefinch abundant

Desert (western black throated sparrow) several

Phainopepla 1

Started with wagon at 7:46. Cross-
ed a divide and a gulch, then another
divide at 2300 ft. 9 a.m. Crossed still
another and into another, where we
reached Rattlesnake Spring at 10:35 and
camped. Altitude 2425 ft. by aneroid. Hot.

Canyon wren here

Mourning Dove

1 Robin

2 turkey vultures

Had a big-eared rat in trap this morn-
ing, and took an antelope squirrel at base
of Dead Mt., altitude 3200 ft.

Quail abundant in all these gulches.

At noon I started to get a view of

the mountain to see what is the best route to the top. at 2 p.m. I reached the saddle at the west end of the mountain, altitude 3200 ft. Then started down the gulch to the spring, reaching camp at 4:30.

Rattlesnake Spring, Nev.
Wednesday, Wash. 29, 1911.

Up at 4:30 a.m. Owl called through night
thus ^{who} E E E E+

Started at 5:40 a.m. for Dead Mt. - Robbins, Jack Jones, Harrington and ^{and} ~~Dr.~~ Very high ^{cold.} wind on the mountain. We went up the S.E. face and reached the top at 10:30. Barometer at stone monument on apex read 5690, probably high barometer on account of wind.

Started back at 12:15, stopping considerable Robbins and ^{and} and reaching camp at 4 p.m. Harrington and Jones came later.

Saw white throated swifts on Mt. at 4000 ft.

Rattlesnake Spring, Nev. Thursday,
Wash. 30, 1911.

Up at sunrise. Bright, warm, breezy. Started for Ft. Mohave by wagon at 7:20. One deer mouse in traps. Reached river opposite

Ft. Mohave at 2:45 p.m. and got across the river at 4 p.m.

Ft. Mohave Ariz. Friday
Nov 31, 1911

Bright morning. Robbins left on morning stage. In afternoon Harrington and I took Indian animal names from Chemehueve Indians.

Deer mice puzzled them. One young man put 2 species together, separating them by size only, but correctly designated the "blue" young specimens of *Lovora deermouse*, ^{as young} No two agreed upon the names except after much arguing by Harrington.

Insects #143-144-145 - they identified as house fly until difference in color and habitat was explained.

Temperature today 96°.

Ft. Mohave, Ariz., Saturday
cloudy, cooler this morning. ^{Apr 1, 1911}
Worked all day getting Chemehueve names

of plants and animals. In most cases they gave names with no hesitation and distinguished species superficially resembling each other.

In evening a strong west wind arose, with lightning, in the south.

Indian girls at first about as white girls, but at 12 to 16 begin to get fat. Indian husbands and Shoshone women all fat.

Have boards padded, with arch over head to keep cover from face, for babies. Rock babies on knee in this primitive cradle by moving the knees to and fro sideways.

Shoshone woman was working on a basket, scraping the twigs with knife and weaving slowly. Said it would take a month to finish the basket a foot or so wide and 6 inches deep.

Ft. Mohave, Ariz. Sunday
Apr. 2, 1911.

Bright, cool morning, soon heating up. Put up a duck, then went to Shoshone house to discuss mammals with them by use of colored pictures.

Fort Apache, P. O. Mohave

Fort Mohave, Ariz. Monday

Apr. 3, 1911

Bright morning.

Harrington started for Needles on the stage at 8 a.m. and I started up river with both guns and packful of lunch, water and collecting outfit.

Mosquitoes by thousands

Lambert's quail common - shot 1.

Intermediate sparrow 1

Black-throated sparrow common

Desert song " "

^{Sydney's} Red-tail hawk 1

Abert towhee common

Phainopepla 1-1

Stansbury's swift common abundant

Resplendent lizard common

Killdeer common at fort

Robin 1

Coactus wren 1

Zebra-tailed lizard 1

Cormorant 12 shot two, one drifted beyond reach, got other by wading

Caspian Tern, shot one, got it by

undressing and wading in deep water
through tall tules.

Collared lizard 1.

Started back at 12:45; reaching the
fort at ~~2:00~~ 2:30 p.m.

Put up the quail and tern in the
tern in the evening.

Ft. Mojave, Ariz., Tuesday
Apr. 4, 1911.

Partly cloudy, very windy day, southerly wind.

Put up the cormorant in forenoon.

Then gave a natural history talk to
a class of 22 Indian boys and girls from
14 to 16 years old, using specimens for
illustration.

Spent afternoon washing my clothes and
preparing boxes for shipment. Also cleaned
up the room.

Ft. Mojave, Ariz., Wednesday
Apr. 5, 1911.

Cloudy, cool morning. South wind.

Started up river at 7:30 a.m.

Killdeer at foot and up at big lake
2 ducks unidentified

Took 1

Rough-winged
~~Bank~~ swallow - took one saw many

Violet green swallow - saw a few.

Desert (Black throated) sparrow

Great blue heron!

Cormorant 2

Chimarron teal 15

Abert Towhee common

Booby!

Phainopepla 2

Warbler ^{Lyons} took one

Red wing blackbirds

Vermillion flycatcher!

Returned at 3 p.m. Still cool.

cloudy and windy.

saw many coon tracks.

Harrington returned again in the evening.

Fort Mojave, ariz. ~~Foot~~

Thursday, April 6, 1911.

Stayed at camp all day, put up
2 birds, ~~and~~ began packing and

sorted Harrington's ethnological slips.

Bright, warm day.

Harrington started down river again
in morning.

Ft. Mojave, Ariz., Friday

April 7, 1911.

Bright forenoon. Cloudy and windy
afternoon.

Finished getting Harrington's notes in shape
and did a lot of packing.

Ft. Mojave Ariz., Saturday
Apr. 8, 1911.

Bright cool morning.

Took ashy throated flycatcher and
saw several others.

Saw flock of yellowheaded
blackbirds, both sexes, on barn
and shot 2 females cowbirds out of
same flock.

Went down to bottomland and saw.

ashy throated flycatcher several
Say's Phoebe 1

Western meadowlark 1.

Bullock's Oriole 1

yellow-headed blackbirds a dozen or more
cowbirds " " " "

Mourning dove 6

Rough winged Swallows 10

Abert's towhee a few

Sage's warbler 2

Sparrow unidentified

Songs of several unidentified species.

Killdeer.

Fort. Mojave, Ariz. Sunday
April 9, 1911.

Bright, warm morning.

At 9:30 I started with Mr. White and his brother (Mohaves) for the Nevada side, where we were joined by three other Mohaves with a fish net arranged with sticks about two feet apart instead of lead and cork lines, to seine a lake on the Nevada side.

In some tules they set the seine by pushing the seine into the mud and

tried to drive fish out of the tules,
unsuccessfully.

They caught ~~3~~ 3 humpbacks and one
salmon.

Then they put in my 15 ft. minnow
and caught a lot of small catfish and 2 other
small fish.

I shot a fine bull snake 56 1/2 in. long
and got a small garter snake & some insects
got back very tired in time for supper.

Lute Wilson brought in a road runner
which I skinned after dark.

Fort Mojave, Ariz., Monday,
Apr. 10, 1911.

Bright morning.

Up early. Had everything packed ready to
leave at breakfast time. Started with wagon
filled high with boxes and bundles at 8: a.m.
and reached Lincoln's store, Cottonia at 9: 55,
with Chenevieve driver.

Rough winged swallows - at Fort Mojave.

Killdeer " " "

1 roadrunner on mesa " " "

2 says Phoebe at Ft. Mohave.

4 Phainopepla in bottomland brush.

Gambel's Quail, several flocks

Mockingbird 1.

Abert's Towhee

Stansbury's swifts common on mesa

Tessellated lizard " " "

+ morning delightful, neither hot nor cool nor windy and no mosquitoes.

The mesquites, which were quite bare upon our arrival about March 1, both species, are now nearly in full leaf, making the valley quite green.

The Mohaves and Shoshonees who can speak English well, are usually polite, using "please" and "thank you" constantly, but there are many exceptions, especially among the younger people. I heard very little swearing, but the Shoshonee Fisher bunch were rather profane, Dick Fisher and Smith cursing their horses and mules freely.

at Lincoln's we are provided with a tent and most of our outfit and boxes are outside the tent on the

ground, for lack of room. Fortunately the weather is good. Arrangements are made for our meals at a ranch house a quarter of a mile ^{or more} away.

W. Black Phoebe at Lincoln's store.

Took 2 zebra tailed lizards " " many are paired.
L. rail at " - paired.

Lucy's warbler heard " " "

Phainopepla common " " "

aberti Towhee " " " "

Blackbird

Tenellated " " " "

Weather has continued fine all day, one of the best days we have had in the valley.

Saw one big cottontail, many tracks and rabbit holes.

At 7:30 I went to bed outside the tent, under the stars, in bright moonlight.

Bottonia, Ariz., Tuesday.

April 11, 1911.

Quite cool at dawn, bright, warming up rapidly after sunrise. Up at 5 a.m., breakfasted at 6 a.m. Landledy is Swiss.

Deermouse, Sonora, 1 young one in trap.

Did not save it.

Oriole, Bullock's, 1.

Platanus trivialis, 1 dead shell.

Physa, sp., several in slough.

Three crows flew over at 6:30 p. m.

Wind blows hard from the west every afternoon, tempering the heat. The mountains this evening are a dim blur on account of the dust in the air. Gale continued with increased fury in the early part of the night.

Harrington and Jack Jones returned at 9 p. m.

Cottonia, Ariz., Wednesday,
April 12, 1911.

Bright, cool and calm. Haze of dust from the windstorm hangs over the mountains.

Harrington and I worked with Tapak, Jack Jones and other Indians ^{at} of Lincoln's store on Ethnology.

Acodrunna - they say nest in mesquite tree, nest of twigs - no grass. Eggs white like domestic chicken eggs. Eat snakes, lizards.

etc, frogs, striped water (gaster?) snakes.

Roadway - Roadrunner, rabbit and ^{all} other animals have roads or runways, leading to water, etc. Set snares with spring poles in runways.

divided primaries of roadrunners into 2 divisions, outer to fly with, classed secondaries and tertials together

26 buzzards hovering near the Indian camp as we approached.

In afternoon spent half an hour discussing stars with the Indians and 2 hours discussing tattooing, while the specimens (4 boxes) we brought to get their identifications of waited. At 4 p.m. we had 5 species ^{new} identified for the days work.

Have had a cold for a week and felt miserable all day today. Very little wind today.

Cottone, Ariz., Thursday,

Apr. 13, 1911.

Was very sick all night, bowels running freely. Cold night and at daybreak a ^{strong} cold north wind arose. Bright morning.

Went to Indian camp again to wash or

ethnology

Bought an Indian pot and a jar for 25¢ and 75¢ respectively for the museum.

Indians describe and name two species of yucca - the tree yucca and the one with the long, slender flower stalk and basal leaves.

At noon I had a telegram from Dr. Hodge, of Bureau of Ethnology, asking about the newspaper reports of accident to us. It must refer to our escapade on the first attempt to reach Dead Mt.

Jack Jones showed me a dead King Snake which was in good state of preservation and I put it in formaldehyde.

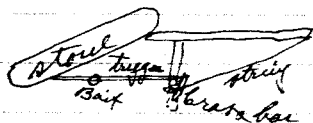
Cottonia, Ariz., Friday
April 14, 1911.

Cold, strong north wind this morning. Continued ethnology. Handled only one specimen in forenoon.

Mohave told me in old days before white men came the Indians, ^{women & children} were

not fat as they are now. They were usually starving and ate various species of rats, etc.

Indian gopher trap



lever

String passed $1\frac{1}{2}$ times around fulcrum

Cottonia, Ariz., Saturday,
April 15, 1911.

Bright morning. Cold north wind continues. Fixed my bed better and got it where it was better protected from wind last night, kept warm, slept better and my cold is better this morning.

Continued ethnology.

Antelope squirrel killed at Dead Mt. Mohave named it and said it occurred in brush of bottomland. When told that it was taken in the mountains they gave it another name but said they could not distinguish it except by the fact that it was killed in the mountains.

Chipmunk - they do not know it from pictures - say it does not occur here.

Report large, bushy-tailed ground

squirrel - possibly the California ground squirrel of the coast region - as occurring ^{in this region.} ~~here~~ California ground squirrel (*Citellus beecheyi* Richardson).

Stephens (~~Mammals of California~~ *Mammals of California* pp. 61 etc.) says "abundant in nearly all parts of central and southern California, frequenting open valleys, brush and rocky hillsides alike"; described to Indians, they say found at Kingman, etc., "given to Hualapai, not given to Tohavi" by the culture hero or chief god.

They know beaver, muskrat and pocket gopher, identifying them from pictures and describing them, mentioning the "bags" (cheek pouches) of the gopher and comparing the pouches to those of the ~~go~~ Kangaroo rat, which was shown to them.

Woodchuck - too low for them - found only above 5000 ft. according to Stephens "California Mammals" and according to our Colorado observations.

Prairie dog - no records in Stephens' "California Mammals" and none west of San Pedro River (Monument #98) in Mearns

Mammals of Mexican Boundary pt 339, 345.

Harrington says he has a name for it in the mountains just east or north-east of here, at Kingman.

Indians eat pith of tule while green.

They describe a Kangaroo rat with body $5\frac{1}{2}$ inches long.

Failed utterly to correctly distinguish house mouse and deer mice.

Indians formerly ate most or all kinds of mice and rats and many kinds of lizards. Fond of bats.

They confused the free-tailed bat and small pale bat under one name.

Stephens (California Mammals p 234) says Sonora otter (*Lutra canadensis sonora* Rhoades) "occasionally caught in the Colorado River," perhaps southward. The Schenck and I have thus far failed to recognize picture.

Cottone, Ariz., Sunday.

Apr. 16, 1911.

North wind continues, but not so cold. My cold is better. Everything about camp

is full of dust.

Have heard killdeer several times here and saw 2 this morning.

also saw 2 sparrow hawks.

Intermediate sparrow 1 (possibly white throat)

Elk - have no records. Occurs in

Kern County and formerly over much of Central and Northern California, including San Joaquin and Sacramento Valleys (Cal. Mammals p. 48). The Eastern Arizona form not known to reach Lower Colorado River. Chamberlaine did not recognize pictures or description.

Mule deer: smaller tail than Blacktail or Western whitetails, naked part way down on under side, terminal third black, remainder white, thus: ♀

Burns deer (Odocoileus hemionus eremicus Mearns) like mule deer but larger. Found on level ground rather than mountains, even in the mesquite timber of the Colorado Valley where they feed on willow twigs along the sloughs. I saw also where these deer had eaten the wild gourds ("mock oranges").

Stephens "California Mammals" p. 5-1.

California Wile Deer much smaller than Burro deer, touching range of latter along edge of Colorado and Coachah Deserts.

Ibid p. 5-2.

Antelope (*A. americana*) almost exterminated in California. A few in Modoc, Lassen and Mono Counties. Ibid. p. 5-6.

^{Shenehere and Mohave know it.}

Woolly Bighorn (*Ovis nelsoni* Merriam) range Southern Nevada, southeastern California, the northeastern border of Lower California and probably western Arizona. ^{Ibid p. 5-7.} Prefer hills and mountains, but come into small valleys. Shenehere and Mohave are familiar with it.

Beaver - black - practically extinct in Southern California. Ibid. p. 230

Sonora Otter "occasionally caught in the Colorado River. While not common, they are not rare." Stephens, California Mammals p. 234.

Badger, probably western (*neglecta*) in the mountains ^{and higher valleys} of California, and californica in the lower valleys. Ibid. p. 236

Skunk - Arizona (*mephitis ester* Merriam) Arizona, New Mexico, etc., and eastern California along the Colorado River. Ibid. p. 239.

skunk - Western Spotted (*Spilogale phenax* Merriam) common in many valleys of central and southern California. Sid. J. 240. Chemsinan recognized picture and said it occurs in mountains. They distinguish it from the striped skunk, whose picture they also recognize. Stephens says it ordinarily does not range as high as the larger skunks do.

Wolverine, fisher and marten likely do not occur here.

No mink records yet and saw no tracks. Indians have not recognized my descriptions. Look up in Elliott, etc.

No weasel records yet.

No shrew records yet.

Moles - have seen no mole runs. Stephens reports several spp. in California but I believe his records are mostly for mountains spotted but reported at Yuma, Ariz.

Stephens, California mammals p. 264

Yuma Bat, type loc. old Ft. Yuma, Cali. Id. p. 267.

Marten bat " " " " " " " " 269

Cali. long-eared bat " " " " " " " " 276

Saw marsh hawk in evening.

Saw about 25 male redwings. Their notes are very different from those of the redwings of Colorado.

Hot afternoon, & calm. Mosquitoes bad in evening

Cottonia, Ariz., Monday

Apr. 17, 1911.

Quite cold just before daylight. Bright, calm morning, soon getting very hot.

Quails calling at daylight.

Phainopepla " " "

Bullock Oriole " *sonnata* "

Redwing - several

Killdeer

Saw a dozen or more orioles in a mesquite tree west of camp.

Collected a cottonwood mortar which was set in the ground a foot or more, at a deserted camp, and nearly all of an ancient basalt mortar S. of our boarding house.

Booled off somewhat noon with N.W. wind

Cormorants - 2 passed over

Buzzard - 1 seen

Ash-throated flycatcher - 1 seen, 2 seen day before yesterday.

Swallows (Roughwinged) are common
abundant here.

Quail very abundant. I suppose I
have seen over 100 today and heard
many more.

Collected a lizard with big, sharply
keeled scales, like the collared swift.

Saw 2 big gecko-tailed lizards,
but could not get near them. Missed
both shots.

Bottoms, Ariz., Tuesday
Apr. 18, 1911.

Bright morning, not so cool as yester-
day. My cold much better.

Crioles common this morning.

Collected insects in forenoon.

At noon Havigton came back from
annual Siskin memorial ceremony and
we continued work on ethnology, but
made no progress, handling only two
or three pictures and no specimens.

Calm and fearfully hot all day.

Indian had never seen kit. loin. Gave two
names, but descriptions vague.

Know bear only through Hualapai.

Badger habits they well know. Say
live in bottomlands and on mesas.

Know but one deer. Say it has
no black tip of tail but resembling
antlers of huro deer.

Heard a yellowthroat in evening.

Bought a basalt metate and mano
for \$3.00 at Indian camp.

Cottonia, Ariz., Wednesday,
apl. 19, 1911.

Bright, hot morning. Night not so
cold as usual. Packed the mortars and
metate.

Continued Mohave ethnology.

used to use ^{dried} alkalimud in place
of salt, throwing a handful in a boiling
pot of meat.

An older Mohave than yesterday said
deer had black tipped tail. Both Indians
yesterday said had no black tip. Know
horns only on female, don't know velvet stage
of growth of antlers. Only knows shedding
of antlers from the Hualapai, and suppose
it is old ones which lose antlers,

but know they grow out again.
The woman ~~also~~ knows the song of the
legend of shedding antlers and getting
new ones.

Do not know spotted skunk, ^{from picture} but do
know striped one.

Do not know mole from picture and
description of appearance and habits.

Vaguely report animal like porcupine
in mountains.

I heard and saw another yellowthroat this
morning.

Found a small bass by the canal and put
it in formaldehyde.

Heard several yellow warblers today.
Chenueve hunted elk up river and
in mountains.

Moheave say Wilson snipe is resident.

Cottonia, Ariz., Thursday

. Apr. 20, 1911.

Bright morning, with strong, cool
northerly wind, which arose about
8 p. m. yesterday.

E. (Edmund?) Lincoln, the postmaster here,
is a son of the Lincoln who accom-

joined Audubon on his Labrador trip.
continued work on ornithology, taking up
birds, having finished mammals yesterday.
Progress slow, because Harrington constantly
swings off at tangents and discusses all
sorts of things totally foreign to birds,
including astronomy, methods of making
combs and dressing hair, tattooing, etc.

They describe the nest and nest
building of the cowbirds.

They say Redwings nest in trees on
account of high water. Female lays eggs
which make yellowheads, redwings, etc.

Had yellowwarblers & yellowthroats today.
 Orioles not plentiful or noisy today.

We have known Merriam turkey through
Yavasupi, from whom they received feathers
before whites introduced domestic species.

They say only one kind of hummingbird
failing to recognize the bright colored species.

Made greater progress this afternoon with
the birds.

Cottonia, Ariz., Friday
April 21, 1911.

Bold, bright, calm morning, soon getting hot.

Saw a belted kingfisher.

" an Anthony Green Heron.

A boy reported a flock of a dozen black-necked stilts on the canal. He described them and recognized a picture of one.

The large canals about Cottonia are necessarily built, rather than excavated, so that the water stands above the level of the surrounding land, thus:



A mohave had a specimen of the Arizona cottontail, young ^{male} specimen, this morning. H.F. 3 in., ^{T. 1 7/8 in.} Ear from notch, dry. 2.75 in. Obtained a large parasite from base of neck. Probably the valley rabbits are all Arizonal, but another sp. occurs to the N.E. in lute.

Saw the process of fire making by twisting a dry arrowweed stick with

the end resting on a dry willow stick.

also saw them roast a rabbit in the hot sand.

Bought water jar, small bowl and big bowl for \$1.⁵⁰ from sister of Cough.

Indians recognize red shafted flicker but say gilded flicker not occur here.

They do not know personally Louisiana tanager nor Cooper. Tomagee

described nest of roughwinged swallow as if made like cliff swallow's nest ^{2 white eggs}, when pictures of barn, cliff and other swallows were shown they declared they had never seen them.

They recognized from pictures and described the black-necked stilt, American avocet, snow goose, Canada goose, white pelican (not California brown pelican), Great Horned owl, but not shrike or long billed curlew.

Their guesses on sex are usually wild and they utterly failed to describe or imitate any birds songs or calls except redwing and ^{gambel} quail.

Finished birds in evening.

Cottonia, Ariz. Saturday
April 22, 1911.

Bright, hot and calm.

Continued ethnozoology, taking up
the reptiles.

The 4 spp. of rattlesnakes appear to be
simply young and all of sidewinder and
Western diamond rattlesnakes respectively.

They say the small catfish seized from
lake is same as big one in river. Two
other spp. introduced.

Finished all but insects in evening.
4 night hawks in evening.

Cottonia, Ariz., Sunday,
Apr. 23, 1911.

Cooler, partly cloudy early in morning.

Began packing ~~some~~ ^{at once} after breakfast,
which occurs at 6 a. m. at our boarding
house.

An Indian brought in a great horned owl
this morning, measured 19 inches. I did
not put it up, for lack of time.

I got a red racer (red whip snake).

Finished packing at noon and spent afternoon with Harrington getting Indian names of the insects.

3 Night hawks in evening. +

Hot day. 101° in shade

Cottonia, Ariz. Monday

Apr. 24, 1911.

Bright morning.

Before ~~break~~ sunrise I saw or heard the following

Mourning Dove

Redwing

Oriole, Bullocks

Cormorant.

Heron sp.

Gambel Quail

~~Roadrunner~~

Buzzard

Killdeer (Roadrunner S. of Cottonia)

Got wagon loaded and started for Needles at 7:30. Reached ferry at 9:15.

At 5 p.m. had the outfit packed and shipped, trunk checked and ticket bought via Grand Canyon.

Left Needles at 9:15 p. m., an hour late. I got berth in through sleeper to Grand Canyon.

Very Warm evening. Has not cooled at all.

Grand Canyon, Ariz.

Tuesday, April 25, 1911.

Arose at 8 a. m., after leaving Williams.

In pinyon ~~and~~ cedar formation. At apex we entered rock pine zone.

Reached rim of canyon at 9:10 a. m.

Here were rock pines, cedars and pinyon ^{and old} young of all three species intermingled promiscuously.

saw hummingbirds

swifts (white-throated?)

pinyon jay

chickadee-longtailed.

red-shafted flicker.

Walked along the rim of the canyon nearly all day.

Bought Navaho blanket for \$12.⁵⁰ at Independent store.

Left for Williams in sleeper at 7:30,
which will lie over at Williams until
after 5 a.m.

Williams, Ariz., Wednesday,
April 26, 1911.

Left Williams on morning train and
reached Adamana at 9:50 a.m. There we
found a three seated rig ready to start for
petrified forests No. 1 and 2. So President
Crossfield, of Transylvania University,
Lexington, Ky., and I joined them. It was
a fine trip. Some logs were about 100
feet long and four or five feet in diameter,
mostly agatized. Returned about 4:45 and
got comfortable room in a cottage.

Adamana, Ariz., Thursday
April 27, 1911.

Up at 6:30 a.m. Got train for La Junta
at 10:15, 27 minutes late.

W. of Douglas I noticed white tailed prairie
dogs for first time, but have not been
watching for them.

at Adamana saw English sparrows.

house finches, Brewer's blackbirds and
harned larks (?), Wilddeer.

6. of Gophers saw sparrow hawk,
Brewer's blackbirds, 4 mourning doves
together.

Snow on higher mts. on both sides
of R.R. in Arizona.

Snow on mountains northeasterly
from Bluewater, N. Mex.

Another and bigger flock of doves near
Laguna ^{and others further on, all in flocks} and a big flock of Brewer
blackbirds.

Sprinkled soon after leaving Laguna.
Doves in Rio Grande valley paired.

Has rained at Albuquerque.

La Junta, Colo., Friday
apl. 28, 1911.

Reached here at 6:30 a. m. Left for Denver
at 7:45 a. m. Raining when we reached
Colorado Springs at 11:30. Reached Denver at
2:30, just on time, and took 4 p. m. train
to Boulder.

Moffat Road Trip

Hogden atlas, ~~Sheet~~ sheet XII - Geology
VI - Topography

Foothills to Middle Park - Metamorphic Granite
Fraser, 10 mi. S.E. of Arapahoe, Uinta (Tertiary) Lake Beds.
N. of Fraser, granite again, thin strip of Dakota then
Lake-beds again

Mouth Fraser River, Grand river enters Laraine
Sulphur Springs, Laraine to Dakota, and Lake Beds
and Granite

Troublesome, Lake Beds and granite buttes.
Kremmling, Lake Beds on Kiobrara, Benton + Dakota,
underlain by granite

N.W. of Kremmling, ~~thin~~ narrow bands of
"Jurassic(?) variegated beds, etc.," and "Red
Beds, etc.," embraced under name
Jura-Trias.

Rabbit ears, alt. 10,719, Basalt, Dakota, Jurassic
and Red-beds, resting on granite, cut
off abruptly by basalt dyke, but
reappearing on the north, where,
however, moraines are mapped as re-
placing red-beds within 2 miles.

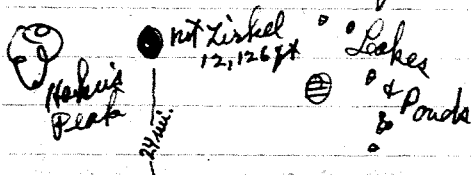
East of Rabbit Ears, Niobrara-Benton pass
 around the dyke. On each side of Big
 Griggley is a narrow band of
 Uinta Lake beds resting on Niobrara,
 the Uinta in turn being overlaid by
 Laramie, which stretches to the
 east for 27 miles. This area is
 marked "continental divide," the
 Laramie being broken by several
 small and one large area of ~~gneiss~~
 basalt, the latter 12 by 10 miles.
 Laramie is given as "Post-Cret."
 Divide, S.E. of Rabbit Ears, separates
 muddy river headwaters (draining
 to Grand River) from Big Griggley,
 (draining to North Platte River).

Muddy Pass 8772 ft.

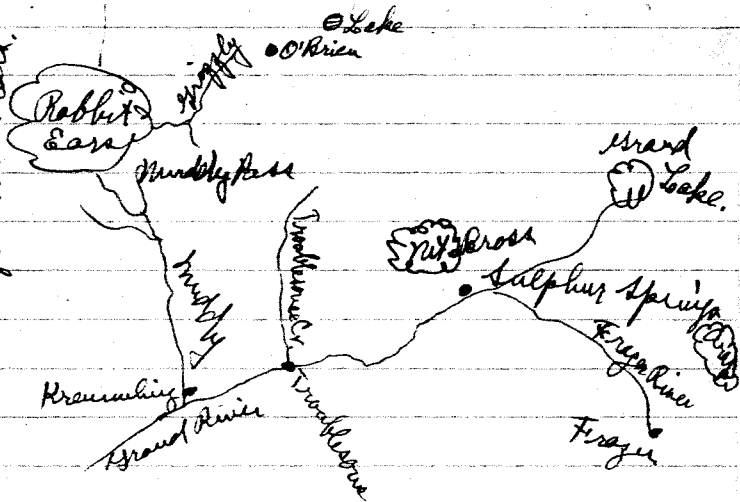
Rabbit Ears, 10,719 ft.

Mt. Ross, N.W. of Sulphur Springs, 9,468 ft.

Junction Butte S.E. of Kremmling, 8263 ft.



Stegobolus 14 mi. W. by N. from Rabbit Ear.



Fossils.

D. P. Howard, ^{attorney,} Sulphur Springs, says big bones in line 6 miles from there.

Geo. A. Pugh, attorney, Craig, Colo., writes of bones T. P. 11 K. R. 92 W., 30 mi. from Craig, 12 mi. S.W. of Dixon, Wyo., N.E. corner Sec. 17.

Reported by Mrs H. Rose.

North Park, King Survey I, 431-434; II, 112-129.

Middle Park: Hayden Rept. 1893, p. 154 et seq.

Cretaceous with fossils, overlaid by *oleritic* Breccia p. 156
Then *Liguitia* (p. 156) conformable with Breccia except at one point. 5,500 ft. thick
Lake Beds *oleritic Liguitia* in lower basins only and are much more recent.

North and Middle Park

Cross, "The Post-Laramie Beds of Middle Park, Colo.; Proc. Colo. Sci. Soc., 1892, pp. 1 et. seq.

"Laramie" of Hayden Survey unconformable on Cretaceous (p. 1).

Probably ~~equal~~ ^{same age as} Denver Beds, 2,500 to 5,000 ft.

Ends in Mt. Cross (p. 3) unconformable on Benton, June and Dakota well-exposed on river bank at base of Mt. Cross.

Fossil leaves abundant in white tuff back of prominent bench 800 ft. above river, also near summit.

Brescia, where cut by river, underlain by Fox Hills and Pierre, with fossils in latter.

Ferns on N. bank of river at Potato Hill Gap, in fine tuff above main Brescia.

Expense Rabbit Ears trip.

Boulder, Colo., Wednesday,
July 5, 1911.

Had sleepless night in tent on account of heavy wind and pain in bowels. Rained & cloudy ^{up} at 5 a.m. Left Boulder on Interurban at 6:20. Reached loop at Denver at 7:44, caught car for Moffat Depot at 7:50, and took train for Kremmling at 8 a.m. with F. F. Grant, Norman E. Hink, and A. P. Russell. P. G. Worcester got off at ~~the~~ "Y" east of Boulder, because his baggage had been inadvertently put off the ~~two~~ car, and went back to town to take a team and catch the Moffat train at Craig. He caught the train all right.

Reached Kremmling at 3:07 in the rain and got team from Martin to haul our outfit to his place.

Spent afternoon and evening sorting outfit over and picking out the part to be taken on first trip out. Rained most of time and still raining when we went to hotel to bed at 9 p.m.

Kremmling, Colo. Thursday

July 6, 1911.

Up at 5:30 a.m. Partly cloudy.

On banks of slough near river found Planorbis ~~to~~ parvus, very large Planorbis expansus, Lymnaea palustris and Physa sp. Also living Succinea cf. S. grossenori.

Red wing blackbirds common

English sparrow "

bliss swallow "

Nighthawk "

White crowned sparrow " (perhaps ^{interme} diata.)

~~So~~ Wagon loaded heavily for start and two saddle horses and four horse team ready at 8:15. Outfit from P. J. Martin. Started up Muddy Creek north at 8:30. at foot

at foot of bluff just out of town we found Pierre shales with impure calcareous sandstones and concretions as north of Boulder, containing Trochammina spp., Baculites ovatus, Scaphites, etc.

at ranch four miles up creek Niobrara, or rather Colorado is well exposed in a bluff on ^{west} east side of creek, with thin bedded limestone at top containing *Ostrea congesta* on a large *Duoceramus*. Below it is more shaly, containing only fragments of plant stems (sea weeds).

"Jakota" s.s. forms ridge ~~on~~ west of Niobrara. The rock looks like that back of Sanitarium at Boulder and is quite hard. The formations dip toward an Archæic mountain but along the slope of the mts. are reversed dips, indicating a fold. The Niobrara itself is an eroded anticline (?) dipping toward the mountain (east).

In the Benton west of the road Grant found 2 casts of cephalopods which I take to be ~~*Archæoceras*~~ *Archæoceras* and an *Duoceramus*.

Two or three miles further up Hinds found *Baculites ovatus* in a bluff, where sandstones resembling the upper Hygiene north of Boulder occur, but they contain very large concretions like those above the

Higgins except larger

a little further I found one ^{dead} *Succinea*
groenlandi ^{skull} on a dry hillside.

It rained most of the time after 3 p.m.

Reached a fine spring at 6 p.m. and
put up 3 tents about 18 miles north
of Kremmling near Muddy creek. Rain
ceased about 7 p.m.

I am very tired tonight, having ridden
horseback all day.

Altitude 8,200 ft. by aneroid.

Mt. bluebirds along road.

Nighthawks and hummingbirds at camp.

Brewer's blackbirds birds below camp

Sparrow hawks " "

Mourning doves at and " "

Jack Rabbit - white tailed " "

2 crows " "

Yellow warblers at "

Took picture of Niobrara bluff four
miles N. of Kremmling and of Whiteley
Peak, at first camp.

Muddy Creek Camp,

Friday, July 7, 1911.

Up at 5 a.m. Partly cloudy.

Collected 3 specimens of *Ballonia cyclophorilla* in aspen grove, east slope.

Broke camp at 8 a.m. and started on up the creek.

The creek bottoms of this region are flat, grassy and wet, showing fine stream meanders and many former abandoned channels. The stream terraces or mesas are emphatically sage brush terraces. There is little timber, aspen and conifers. Whiteley Peak and some others are sharp. The divides, generally speaking are low and rounded.

Camped about 4 miles below Muddy Pass, ~~at~~ at 8,500 ft., at noon.

Arctohelix cooperi common under sage brush, etc., on creek terrace.

Started on at 1:10.

At Muddy Pass, instead of going down to the Dunlap ranch, we took the Steamboat Springs road for about two miles, and camped on a creek in coniferous ^{open} timber at 9,200 ft., about ~~one~~ south of Rabbit Ears Peak, at 4 p.m.

Rained some this afternoon but partly cleared soon after going into camp.

We have up three 10x12 sleeping tents, a cook tent and ~~stay~~ dining room fly.

Moquitoes big and abundant.

Am very tired, having ridden horseback most of the day.

Aspens 6 to 10 inches in diameter just below camp.

Oreohelix cooperi (dead shells) very abundant at head of Muddy Creek, but not after getting into spruces and firs.

Violet green swallows below camp.

White tailed jackrabbit down creek.

Pine squirrels at camp.

Rabbit Ear Peak,

Saturday, July 8, 1911.

Up at 6 a.m. Bright & clear.

Started from camp for peak at 7:30 a.m. on horseback. Aneroid reads 9,425.

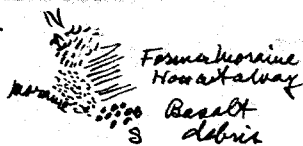
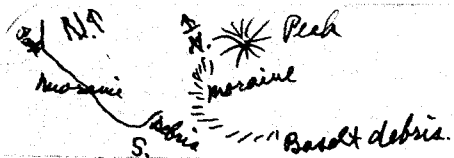
On road just N. of camp are black shales like lower Bentaa at Boulder.

The ridge to the west is just like the "Sakote" at Boulder.

On S. slope of Mts. are large Boulders of ~~orphan, gray to red, like Fountain at Boulder~~ gray granite and red crystalline rock. The peak is igneous breccia.

Reached top at 9:15. My aneroid reads 11,000, high wind blowing.

About S.S.E. from peak are glacial deposits, of fine material with more or less coarse stuff. The ground mass is clay, with large admixture of finely divided quartz and feldspar and ^{possibly} a little mica. Probably the mica and feldspar of the original rock form the clay. On the surface are large granite boulder and in the mass many smaller ones, all well-worn and showing flattened sides, which flattening may be likely at least partly structural. At the lower end of the moraine is a deposit of fine and coarse angular basalt, which probably came down over the moraine from the peak, and since then the amphitheater has been cut, thus:



Section across moraine valley

The glacier must have come from the high N.W. to the S.W.

Hinds and I lunched at 11:30 and started west at noon. Found great series of moraines west and southwest of peak, composed mostly of granite, little or no basalt.

Found ^{igneous and} granite in place about 2½ or 3 miles W. by S.W. of peak.

At least one filled ^{glacial} lake basin occurs.

On the east slope of the "Dakota" ridge we found considerable of the basal conglomerate, many pieces showing the conglomerate-sandstone contact. This indicates that the formation is upturned (if the conglomerate is really basal) or the conglomerate could hardly have been broken out and carried down the slope. The ~~ridge~~ ridge is broadly rounded on top.

The glaciers must have come from the northwest, as indicated by the shape of terminal moraines and character of material.

4 crows on top of peak, 10,719 ft.

Robin and meadowlark at 9,500 ft.

Violet-green swallows at top of peak

Mt. bluebird common

1 Say's Spermophile at 9,500 ft.

Little chipmunk (small species) common

Heard one woodchuck

We reached camp at 4 p. m.

It is a hard country to travel in, with much wet ground, patches of heavy timber and much fallen timber.

Trees at ~~the~~ higher elevations show effect of prevailing west winds, as in the Front Range.

Rabbit Ears Peak

Sunday, July 9, 1911.

Up at 7:15; 1/2 inch ice on water bucket and white frost.

Took 2 pictures of the Peak, ^{from S.} one looking S. to Whitey Peak and one of camp.

Collected mollusks in aspens below camp.

Saw 1 woodhouse toad at 9,500 ft.

Sparrowhawk

Say Spermophile, a few

Pine squirrel common.

It has been a perfectly clear day, rather cool, with westerly wind.

Rabbit Ear Peak, Colo.

Monday, July 10, 1911.

Breakfast at 6:30. White frost.

bayotes dug into our garbage pit 100 feet from the cook tent last night, in spite of the barking of the dog and his occasional runs toward them.

The Hinds and I started north on horseback at 9:30.

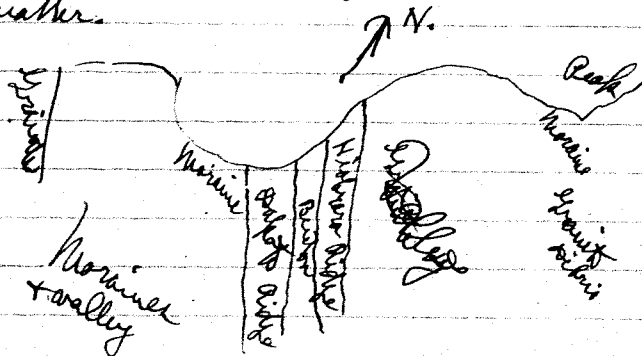
The black shale just north of camp on ~~the~~ east side of road which we have taken for Benton contains numerous fish scales and may be Niobrara. It is separated from the "Dakota" ridge to the west by a broad valley which likely is occupied by Benton.

Yesterday Trout brought from ~~the~~ south of camp similar material with similar fish scales associated with *Ostrea congesta*.

These shales are probably very calcareous and are likely the cause of the scattered ridge which extends northward to the ^{W. end of} Rabbit Ear peak dyke; with a valley separating it from the Dakota.

The "Dakota" ridge is covered with granite and basalt debris for the upper 1000 ft. or more in approaching the dyke and we found no rock in place anywhere, with none of the conglomerate fragments on top. The broad top of the ridge and a very slight tendency to separate into 2 ridges in places suggests an upper and lower ~~ridge~~ ridge making member as at Boulder, with softer medial horizon.

at S.W. corner of dyke is suprainal matter.



Passing over the dyke we found an exposure of typical "schota" as developed north of Boulder - massive sandstone at top, ripple marked and containing plant impressions, softer, thinner sandstones and clays below this, and a basal conglomerate. It forms 2 benches in a sharp escarpment. Dip 22° N. 35° E.

The lower talus, beneath the conglomerate is ^{finely divided} black shale weathering gray, etc., which must be disintegrated Morrison.

I estimate the Dakota at 100 ft. thick.

The shale beds in the upper ^{2/3 of} Dakota are alternated with thick and thin bedded sandstones. Really the whole thing is a mass of rather soft sandstones and clays underlain by conglomerate. In one of the upper clay bands are great quantities of plant fragments and poorly preserved leaves, of which we collected some, probably not identifiable.

Saw mule deer tracks.

Night hawk flew up on Dakota ridge S. of the ~~the~~ dyke.

Archoliz cooperi at 10,000 ft.

Rabbit Ears Peak.

Tuesday, July 11, 1911.

Warcester, Groat and I started S. on horseback at 7:15 a.m. cloudy.

Niobrara exposure of limestone where Groat collected fossils ^{of *O. coeque*} Sunday dips 6°

~~N. 15 W.~~ ^{S. 65 E.} magnetic. On Muddy Creek.

Whiteley's Peak bears S. 76 E., Bear Mt. bears N. 77 E. magnetic

This is a decided limestone, with a few poorly preserved *Ostrea coeque* and abundant plant fragments showing no structure, probably marine algae.

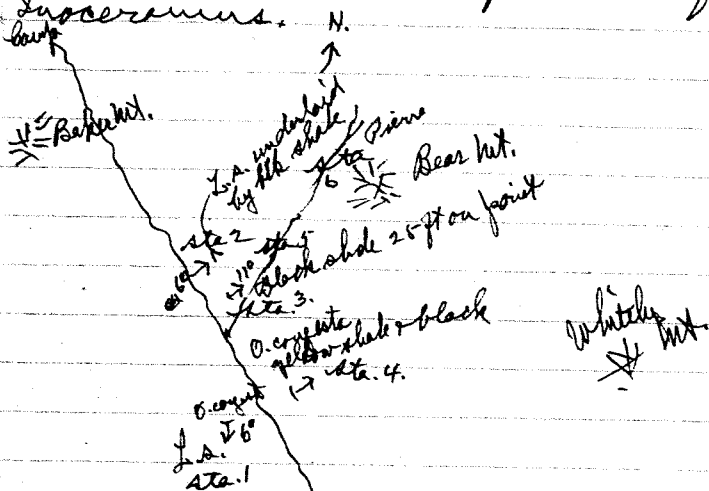
About half mile up creek above the wagon road crossing, is an exposure of limestone underlaid by black shale dipping 6° N. 17 E. magnetic. No fossils but ^{plentiful} plant fragments.

Oreohelix cooperi abundant ^{here}, but both dead and alive, under sage and other brush on slopes. Live ones mostly ^{just inside} on edges of brush, not in interior, and most abundant on the face of the terrace slope - few on top or in bottom land. altitude 8,500 ft.

On W. side of lateral creek S. E.

of this exposure, are thin bedded black shales, either upper Niobrara or Pierre, dipping 11° N. magnetic, about 25 ft. thick in bluff at point

On S. side of creek the higher yellowish shales are exposed, with the same dip, containing *Ostrea congesta* and fragments of large *Inoceramus*.



Station 4 exposes over 150 ft of calcareous shale with *O. congesta* scattered over face of slope from base to top.

Woodhouse road here at 8,500 ft.

Up lateral creek a few hundred rods is another Niobrara exposure on E. bank

N. of Niobrara is igneous dyke
N. of dyke in same lateral creck
near foot of Bear Mt is 200 ft or more
of Pierre containing bivalve oysters
and fish scales. Dip 11° N. W.

After leaving here lost bag contain-
ing \$67.00 pair of field glasses and tried
to follow the trail back to find them
but did not find them. Then started
to camp.

Examined outcrop of Benton in gulch
N. of miner's cabin about a mile below
camp. It dips northward at a high
angle and contains *Duoceramus fragilis*
and *Prionocyclus wyomingensis*
~~probably *Acanthoceras coloradensis*~~
poorly preserved.

Reached camp at 5:30. Clear after-
noon hot.

Rabbit Ear Peak,

Wednesday, July 12, 1911.

Bright and hot. We all started
on horseback at 7:15 - to look for
the lost field glasses. Went to where
I left them last at the Pierre out-
crop. Followed the trail easily

until we reached the thick timber, where we dismounted and Worcester and I followed the trail very slowly, step by step, through the timber. I found the bag just after leaving the timber.

We then started S.E. and found Pierre shales on ~~s~~ S. base of Bear Mt., across gulch from outcrop examined yesterday.

At the edge of the terrace S.W. of Bear Mt. we found a thin exposure of baked Pierre shale containing poorly preserved *Duoceramus vanuxemi*, *D. barabini* (?), *Baculites* sp., *Placenticeras* sp. and fish scales. ^{~~underneath~~ overlaid by basalt.} The edge of the laccolith turns up all around so as to enclose a lake on the terrace.

S. of Bear Mt. the valley is occupied by Pierre shales, extending up on the slope of the Mt. also up to the top of the next terrace south, where it dips gently to the southeast.

Well up on the slope of the laccolithic terrace is a coarse sandstone and conglom-

crate containing many water-worn quartz pebbles up to an inch in diameter.

Reached camp at 6 p. m. Found C. A. Smith here.

Norman saw porcupine yesterday at 9,600 ft.

Saw dusky grouse yesterday and today near Bear Mt. at about 8,600 ft.

Tanagers today at Bear Mt.

Brewer's blackbirds on muddy creek.

Rabbit Ears camp,

Thursday, July 13, 1911.

Partly cloudy, warm morning. ^{Hazy.} East wind.
Last night was warmest we have had.

Team ran away as driver was ready to start for Steamboat Springs. Not much damage.

Norman and I started at 7:45 on foot, horses all having been sent off to be shod.

Reached crest of dyke to the north at 9:40.

Diocerasmus cf. *labriatus* on east slope of "Dakota" ridge.

Dropped down into amphitheater north of dyke + worked to N. E. corner of dyke, where we found granite morainal matter.

Then worked N. and found mostly

basalt fragments, with basalt apparently
in place at one point. The amphitheater
contains many low ridges and lakes.
Its walls and the ridge slopes are all
steep. About a mile N. 10° E. true bearing ^{from peak} we
found an unwooded moraine of granitic
material with strike E.-W.

The ~~Sakota~~ ^{Hayden} survey has a wide "Sakota"
area mapped as abutting on the N. E. point
of the peak and occupying the big amphitheater,
with moraines west of it. Instead the
Sakota forms a ridge at the west of the
main cirque, with moraines E. of it.

Starting west in a few hundred yards
(probably not 200) we found ~~to~~ a stream
cutting the moraine and deeply into a
black ^{Piceance} ~~Piceance~~ clay dipping 23° S. containing
large numbers of ^{shelled} *Duoceras* ^{deformis} *paucifera*.
The clay ^{is} ~~was~~ water soaked, making it hard to
get good specimens.

Passed on around the north end of the
Sakota bluff and from 600 to 1000 yards west
thereof found a fine exposure of Morrison
green clays and a little limestone in the

West face of a high ridge. There was a little
lower Dakota ~~sa~~ in fragments on the ridge.

Then proceeded west to granite, and
turning S. E., climbed out of the amphitheater
and reached camp at 7:30, very tired and sore.
There were many high ridges, covered with
standing and fallen timber and filled in with
wet vegetation, swamps intervening, making
travel difficult, in addition to the hard
climb over the dyke twice, the second time
when very tired and carrying a heavy load.

Rained or sprinkled at intervals all
afternoon.

Saw woodchuck N. of camp at 9,600 ft
and heard them up to 10,000.

bonas at 10,000 in rock slides.

Robins and cliff swallows abundant at 10,000 ft.

Meadowlark at 9,500 ft.

Crows on peak, 10,700 ft.

Beaver stumps, very old, occasionally seen.

No fresh work seen yet.

Worcester reports another porcupine and
I saw several trees gnawed by them.

Saw many deer tracks, some very large
and fresh.

Little chipmunk common.

Got to bed at 10:30.

Rabbit Ear Camp.

Friday, July 14, 1911.

Up at 6:15. Bright, warm morning.

So far as I can now tell the upper limit of *Orchelimum cooperi* seems to be fixed by the presence of aspens, as at the higher levels I have found it only where there are aspens. This is not true in the valleys. The same rule holds good in White River Valley.

It is much the most abundant snail here as well as in the Grand Hogback. Down on Trendy creek the dead shells are strewn thickly under sage brush, etc., and live specimens are abundant. They are not so plentiful higher up or even down below in the aspens.

In forenoon packed a lot of specimens, washed some clothes and collected ants, etc.

Saw woodpecker without white markings and much red on head.

They have been setting up a sawmill down

break from here, and at 11:15 a.m. blew the whistle for the first time.

We are camped on ~~a~~ West Grizzly, which flows into the North Platte. The creek just over "Dakota" ridge to the west flows into the Muddy and thence to the Grand. Hence ~~at~~ the low ridge is part of the continental divide.

Hinds found Beeton shales ~~at~~ in gulch N. of the miner's cabin just below camp to dip 34° N. 5° W.

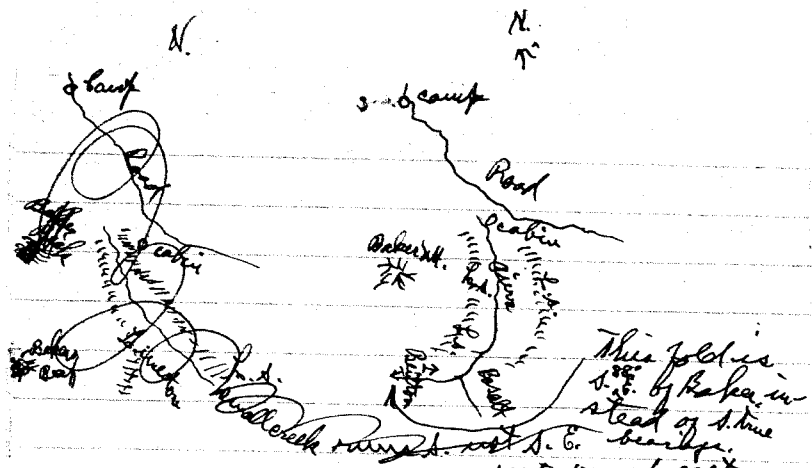
Rabbit Ears Peak,

Saturday, July 16, 1911.

• Cold, cloudy morning.

Hinds and I started horseback for Baker's Peak vicinity at 7:10.

Along S. of the ^{old} miner's cabin below camp, \bullet ^(N. 85° E.) E. of Baker's Peak, we found a strong limestone, dip averaging about 63° E., but changing to southerly in progressing southward and swinging around the hillside as though part of a fold produced by Baker Mt. Found only ~~large~~ oyster fragments. Looks like Niobrara N. of Boulder.



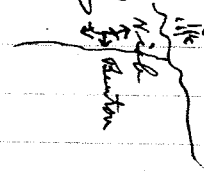
On opposite side of creek, at west of ridge occurs a similar limestone containing apparently obscure plant fragments, dipping about 30° about S.W., I believe, though not sure. Maybe joint planes. If so, then dip is N. E.

400 to 500 yds east
 Occurs with black clay with *Duoceramus deformis* (^{N. Obispo}) is exposed at creek between the limestones, with apparently no dip.

It looks to me as if we have here the creek occupying a syncline.

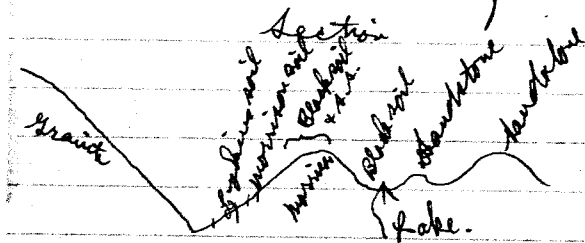
S. of this is a basalt hill.

S.W. of this basalt hill a stream from W. cuts through the end of a Benton fold, thus:



Fold sharp, pitching S. Arenaceous limestone.

Passing around ~~S.~~ S. of Baker Mt. and
 thence W. we found a series of approximately
 N. S. folds of "Sakota" sandstone with steep
 slopes, & covered with fallen timber lying in
 every direction, chiefly S. W. Between the
 last two ^{to the crest} was a small lake and the valley
 was partly occupied by soil which looked
 as though partly formed of Benton shale -
 possibly "Sakota" clay. The westernmost
 ridge is green and treeless, ^{strike N. 15° W.} on top is
 blackish clay soil and ^{much} angular
 sandstone. ^{well about half way down} On W. slope is soil resembling
 Morrison clay and just below it typical
 Lykins soil. To the W. lies granite.
 The Lykins soil is ^{about} S. 30° W. of Baker Mt.



Water lily pads cover most of the lake.
 Immense leeches but only obtained
 small ones.
 Took water beetles also.
 Rocky Mt. Jays here.

Upon reexamination we find the long green ridge to have much apparently Morrison sandstone limestone and some quartzite mingled with the so-called "Dakota" sandstone. My impression is that it is a Morrison ^{ridge} with residual Dakota scattered over the top. A few fragments of Morrison breccia, with green clay and sand with ~~us~~ were found.

S. of the series of lakes, Benton calcareous shales were found passing around the end of the Dakota folds.

Two Marsh hawks seen.

Rained in afternoon.

Reached camp at 5:50 p.m.

Rabbit Ears camp.

Sunday July 16, 1911.

Warm, partly cloudy morning.

Pattered about camp all day, writing, washing clothes, putting up a deerhouse, etc. Cold rain about noon and terrific shower in evening.

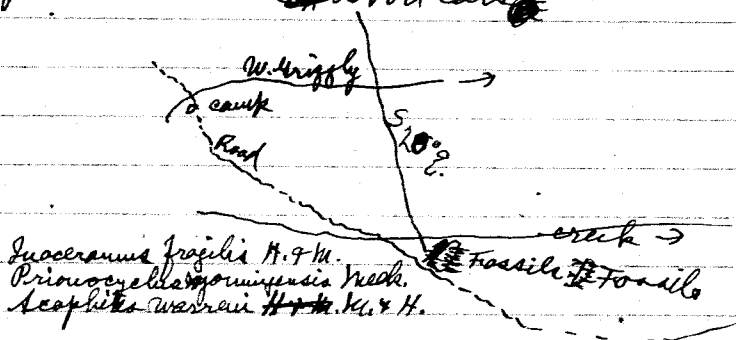
Rabbit Ear Camp,

Monday, July 17, 1911.

Dense fog this morning, but partly cleared by 7 a.m.

Hinks and I went down road until we crossed the creek below camp (south), and there collected 2 bags of Benton fossils from a ridge, S. 20° E. from the Peak.

~~Rabbit Ear Camp~~



The same material found on east slope of another ridge perhaps a quarter mile or so to the east, S. 25° E. from peak.

Down creek at edge of valley on N. side of creek (W. Griggly) we passed along a ^{steep} south-facing slope, following a narrow cattle trail, and noticed numerous dead *Oriskany cooperi*, so I began a search for live ones.

The live specimens are exceedingly numerous and occur indiscriminately under all the bushes - sagebrush, scrub willow, wild rose, meadow-rue, thistles, etc. The locality is occupied by an exceedingly calcareous formation, shaly, either Benton or Niobrara. The vegetation very dense, making collecting difficult, but in a hasty search along a zone averaging 4 feet on each side of the trail for a distance of 72 feet I found a large package 511 specimens, omitting most of the small ones, and probably saw only a small portion of the number living there. They are quite robust. At one place within a radius of five inches I obtained 19 live specimens. Altitude 8860 ft. by aneroid. Vegetation wet and air moist after last night's rain and the morning fog. Snails active, not lying dormant. On adjacent bottom lands, where the soil was black loam, there were no snails, even under the same

kind of vegetation.

Up creek on Benton formation, they again occurred, but not so many.

Here we found Benton fossils on S. side of creek in bluff, dipping S. 22° . Mostly calcareous sandstone, with some strata containing many plant fragments, probably marine algae.

Up creek a short distance 20 ft. of the fossiliferous calcareous s. s. occurs at top of bluff, underlain by 20 feet of calcareous black shales.

The whole exposure I believe is upper Benton, and the one examined down creek where I collected *Susilla* is Niobrara.

Further up creek is black Benton shale, slightly calcareous, thin bedded and harder, no fossils. Benton has minor folds.

Reached camp at 4 p. m.

Day closed clear

Rabbit Ear Camp.

Tuesday, July 18, 1911.


cloudy morning. Rained during night.

I drove a porcupine away from our tent door during the night. He was very light colored.

Baker sparrows common.

at 7:30 Worcester, Groat, Hinds and I started north on the road on horseback. Passed over "Dakota" ridge, where Worcester turned north and the rest of us turned south along the valley west of the ridge, where we found "red beds" (= Dykine) exposed along the west side of valley. Continued ~~at~~ bluff of Dakota sandstone west of Baker Mt., where Groat went on south and Hinds and I stopped.

Dakota s.s. is in a bluff, at ^{one} point strongly divided into 2 benches. It ~~is~~ shows a ^{sharp} eroded anticline at south end.

N.  s. conglomerate not so hard as north of camp.

Found many imperfect leaves in the sandstone, half way or more up the bluff. Did not find ^{the horizon} ~~it~~ in place.

Rained hard at 2 p.m. Reached camp at about 3 p.m. Day closed cloudy.

Rabbit Ear Camp.

Tuesday, July 19, 1911.

Partly cloudy morning.

John W. Fredrum, who owns the lakes at Baker Mt. called and breakfasted with us.

Says ^{block} bear killed near camp two years recently and Mt. lion followed him two years ago. Antelope formerly ranged in valley below camp. A few still range in park not far away. Suckers abundant at lakes in last of August. Trout up here all natives - rainbows planted below but do not get up here and natives not found below because eaten by rainbows.

Common Woodpecker here has white stripe down back and rump.

Saw ^{Western} Great Horned Owl below camp.

Heard Crows

Whithades sp. and horned larks sp. common

Saw 2 wrens, looked like house wren
but song of same style as chipping
sparrow.

Saw large, dark colored rabbit in
woods, without cottontail or white tails.

Returned to camp before noon
and spent balance of day taking
care of snails collected Monday,
cleaning them, etc. and collecting
chipmunks. Set 12 traps before
noon, and before middle of
afternoon had caught 7 chipmunks
and Russell shot one. Caught
them in a line 150 ft. long. Only
skinned three. Caught nothing
else.

Cloudy part of day but no
rain.